June 4, 1945

STEEL

The Magazine of Metalworking plus Metalproducing

ESTABLISHED 1862

ECHNOLOGY DEPT

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DETROIT

PORTER DIESEL-ELECTRIC SWITCHERS

The Ideal Switching Unit for Steel Mills!

● **Economical to Operat**

A Porter Diesel-Electric uses low-cost fuel in high efficiency motors. In addition, unskilled labor can quickly be trained to operate the unit.

● **Easy Accessibility for Maintenance** A new arrangement of doors permits a full, four-door, unobstructed opening for speedy servicing of power plants. The entire hood can quickly be detached.

● **Highest Availability**

A Porter Diesel-Electric is instantly ready for operation. Powered by two independent power plants, it can be operated on either one of them alone.

PORTER
Better Built
Equipment
Established 1866

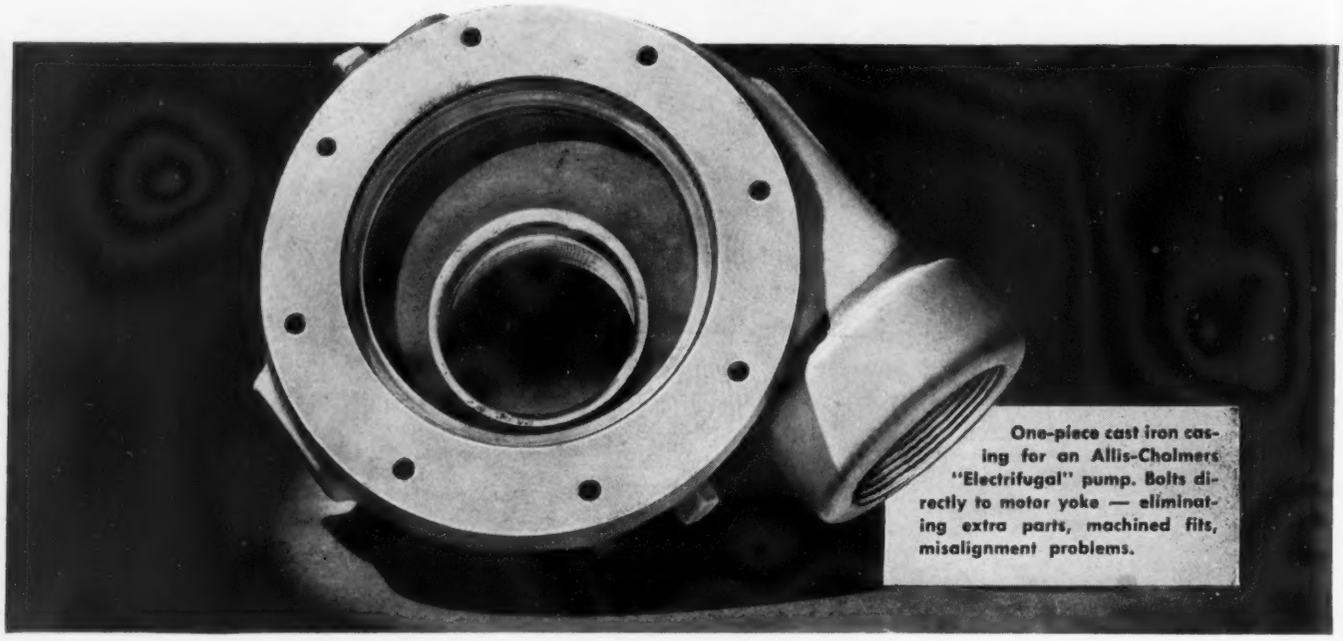
ARMY NAVY

H. K. PORTER COMPANY, Inc.

PITTSBURGH, PA. BLAIRSVILLE, PA.
MT. VERNON, ILL. NEWARK, N. J. NEW BRUNSWICK, N. J.
LOCOMOTIVES · FREIGHT CARS · HEAVY FORGINGS · PUMPS · PROCESS AND OIL REFINERY EQUIPMENT

⟦ PUMP TIPS FROM ALLIS-CHALMERS—ONE IN A SERIES ⟧

How to make CASINGS Last Longer . . .



One-piece cast iron casing for an Allis-Chalmers "Electrifugal" pump. Bolts directly to motor yoke — eliminating extra parts, machined fits, misalignment problems.

ABRASION AND CHEMICAL REACTION are the major causes of casing wear. For if liquid is gritty, or contains foreign matter; or casing is not constructed of the right materials for the pumping service required — casing life is materially shortened. A minor cause of direct casing wear is misalignment.

Original engineering of a pump can help prevent this wear. For example, Allis-Chalmers "Electrifugal" pump minimizes trouble from these sources in two ways: 1 — casings can be supplied in iron, bronze, stainless steel or other materials — depending upon type of service. 2 — It is a *unit-design* pump. Both impeller and motor are mounted on *one* shaft and in *one* frame. This means fewer parts, fewer fits — no chance for misalignment.

However, regardless of pump design, scheduled maintenance is still necessary if you expect to get longest wear from your casings. Some ways to do it . . .

▸Check all piping supports regularly to see that they're effectively supporting the load.

▸Every 6 months check piping itself to see whether it has shifted in any manner. Disconnect suction and discharge piping to see if it springs in any direction. Check the alignment of pump and motor — shimming up units as required.

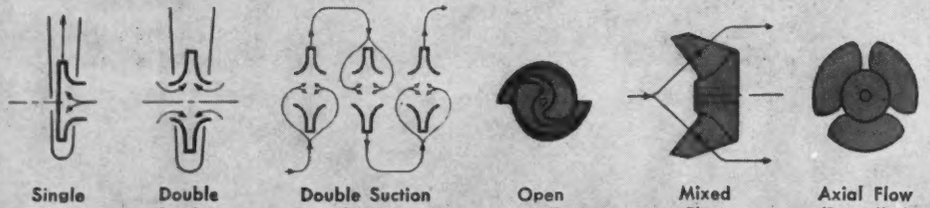
▸Once a year clean and inspect casing for wear, deposits or pitting. Make necessary repairs.

▸If foreign matter is being sucked into pump, wearing casing unduly, provide the intake end of suction piping with a suitable screen.

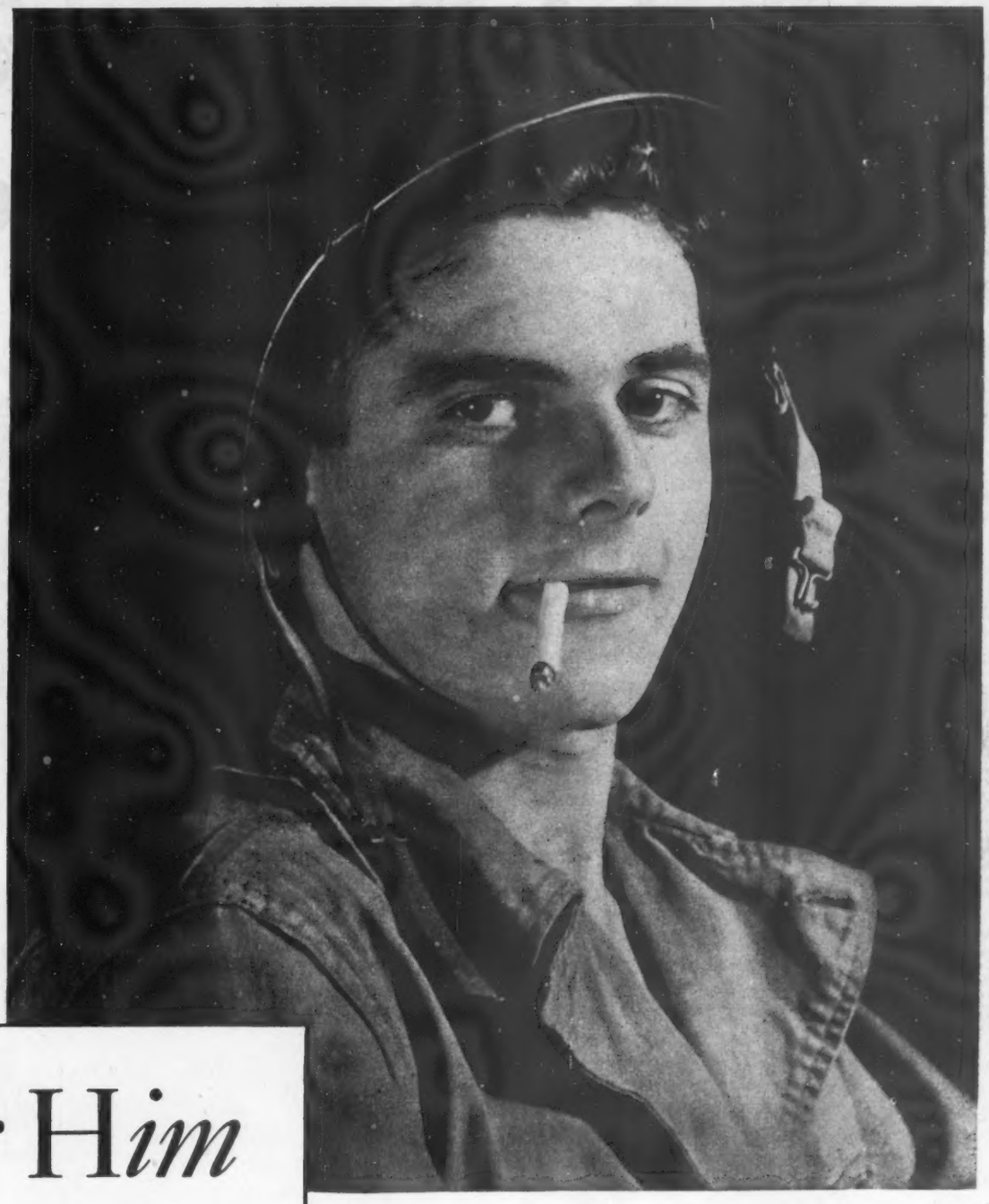
▸Send for your *free* copy of "Handbook for Wartime Care of Centrifugal Pumps". This valuable booklet applies to *all makes* of pumps; contains *no* advertising. ALLIS-CHALMERS MFG. CO., MILWAUKEE 1, WIS. A 1755

ALLIS-CHALMERS PUMPS

Allis-Chalmers builds all types and variations of pumps shown at right. Capacities from 10 to 150,000 gpm—heads to 2500 lbs.



Single Suction | Double Suction | Double Suction Multi-Stage | Open Impeller | Mixed Flow | Axial Flow (Propeller)



For Him

For him, G. I. Joe—or maybe he's a brother in the Navy, in some branch of the air forces, the Signal Corps, or the Marines, or what have you. For every man that's in it, and above all for every man who *was* in it up to the supreme moment. That's what our job is, here on the home front.

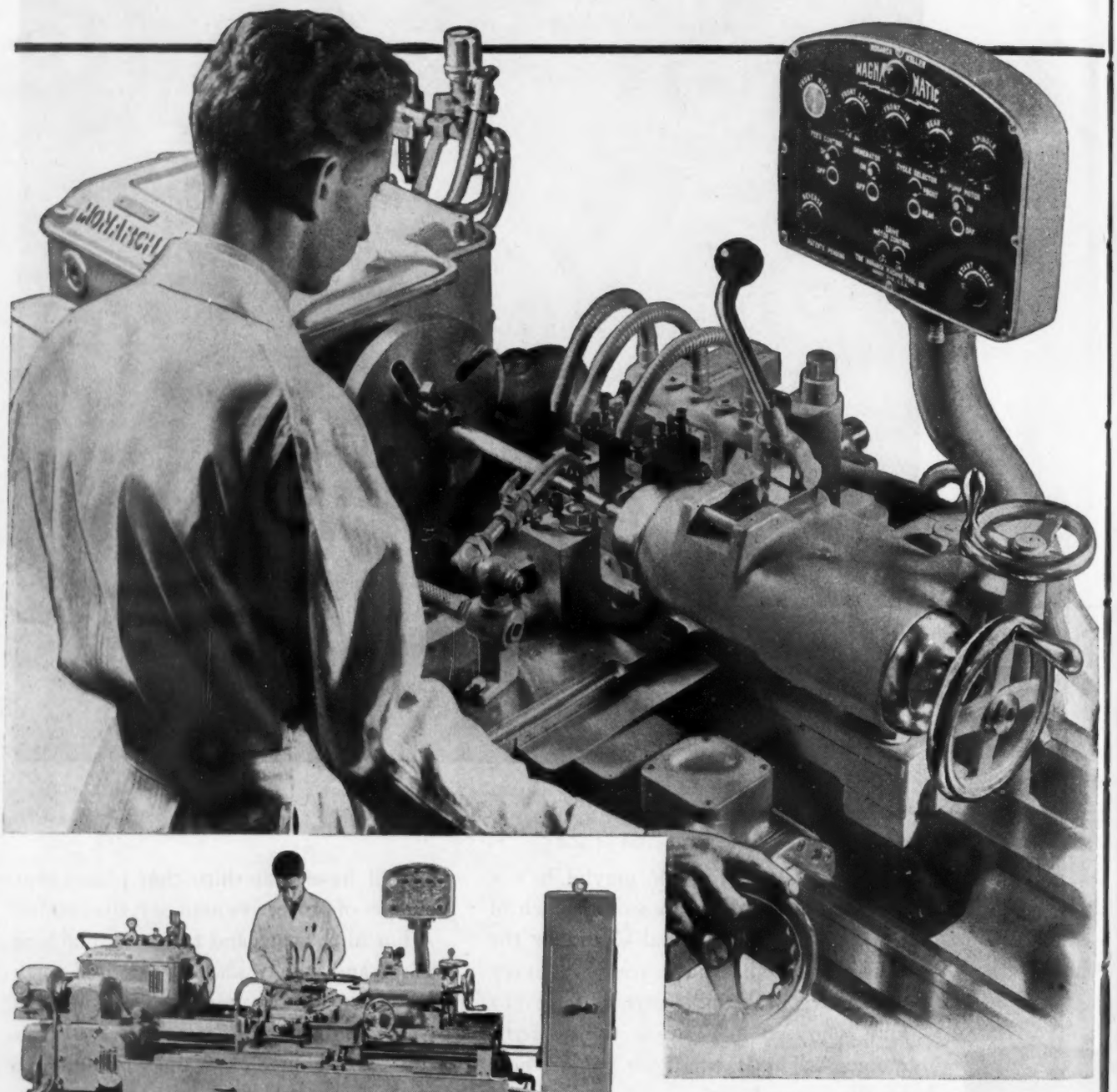
To keep producing the supplies, so that *he* will have that ship, that plane, that curtain of protective artillery, that bullet.

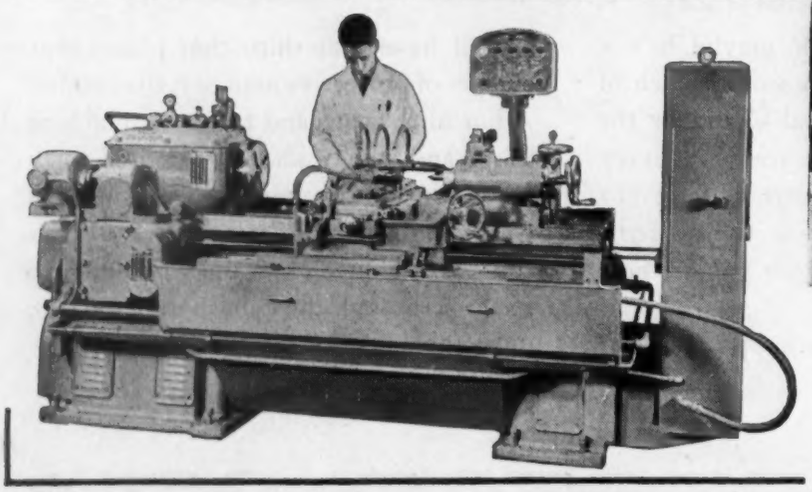
For him, farms and factories, machine shops and steel mills, have poured forth mountains of equipment and supplies. And it must remain our resolve to continue to produce the things he needs to see him through the culminating battles, until the Japs are totally defeated.

BETHLEHEM STEEL

...el, Manufacturing and Fabricating Plants . . . Bethlehem, Steelton, Williamsport, Johnstown, Lebanon, Pottstown, Rankin, Leetsdale, Pa. . . . Buffalo, Lackawanna, N. Y. . . . ...arrows Point, Md. . . . Chicago, Ill. . . . Tulsa, Okla. . . . Corsicana, Tex. . . . South San Francisco, Los Angeles, Alameda, Calif. . . . Seattle, Wash. *Shipbuilding and Ship Repair* ...rds . . . Quincy, Hingham, East Boston, Mass. . . . Staten Island, Brooklyn, N. Y. . . . Hoboken, N. J. . . . Baltimore, Sparrows Point, Md. . . . San Francisco, Alameda, San Pedro, Calif.

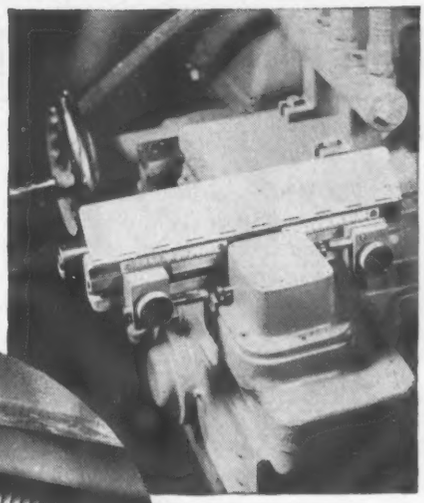
Quick setups for on Monarch





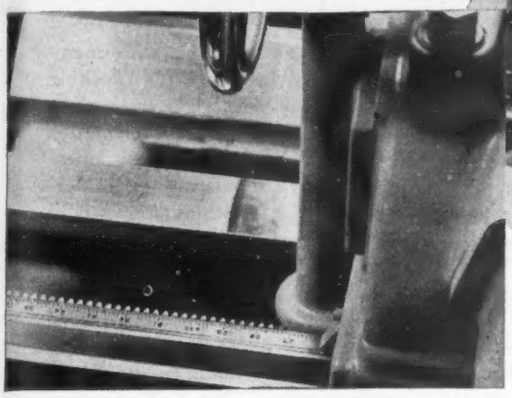
Electric controls permit automatic selection of 6 different feed rates, for faster metal removal or for varying finishes on different portions of work.

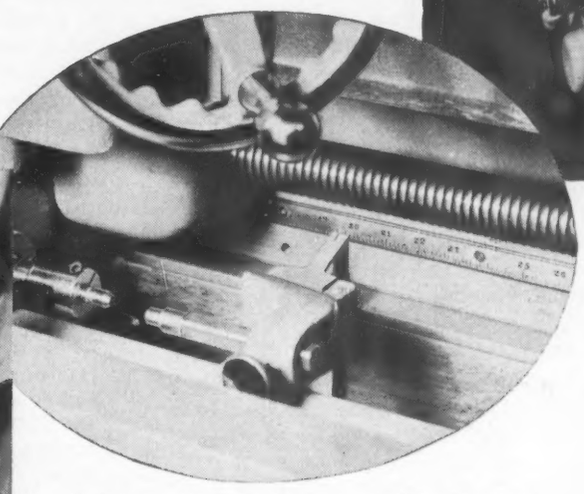
short runs
Magnamatics



Another quick setup feature of Monarch Magnamatics is the finger-tip control of travel to the slides, with easy reading and accurate micrometer adjustments.

Scale and pointer on tailstock for ready positioning of tailstock for various lengths of work. This eliminates necessity of repositioning on setup.





Quick positioning of stops controlling the longitudinal travel of carriage is provided by scale pointer with micrometer finger-tip adjustment.

The facilities illustrated show how the Monarch Magnamatic provides quick, accurate setups. With setup time as low as 5 minutes in many cases, the Magnamatic can be profitably used for as few as 25 pieces, with rising economies on longer runs.

The Monarch Magnamatic is a fully automatic, all-electrically controlled, double-carriage machine for turning, boring and facing work. For 10 years it has saved time and money on peace and war production—and has been constantly improved with the advance in electrical control devices.

One button on the electric control panel starts the complete automatic cycle, and from then on the machine is 100% automatic, allowing one operator to attend two or more machines, with resulting manpower saving and production economy.

Ask the nearest Monarch office or representative to show you how you can apply Magnamatics to your turning, boring, or facing work.

THE MONARCH MACHINE TOOL COMPANY · SIDNEY, OHIO

DIRECT FACTORY BRANCHES

CHICAGO 6, ILLINOIS
622 W. Washington Blvd.
Phone: Randolph 4295

CLEVELAND 6, OHIO
Room 209 Upper Carnegie Bldg.
10465 Carnegie Avenue
Phone: Garfield 2590

DETROIT 2, MICHIGAN
801 Fisher Building
Phone: Trinity 1-0426

INDIANAPOLIS, INDIANA
Maco Building
38 and College Avenue
Phone: Wabash 2650

NEWARK 2, NEW JERSEY
635 Industrial Office Bldg.
Phone: Mitchell 2-1770

PITTSBURGH 22, PENNSYLVANIA
512 Empire Building
Liberty Ave. and Stanwix St.
Phone: Atlantic 6428

Representatives in Principal Cities

Monarch Saves Time

BEHIND THE SCENES

Successful Labor Relations

■ When a manufacturing company in a city the size of Dayton, Ohio has a record for the past twenty-five years of no labor disputes of any kind, and during the last seven years no temporary or seasonal lay-offs of any employe due to any cause, it sounds like some kind of a record. And particularly since production has more than trebled in the last nine years, with fewer man-hours worked.

We had occasion to stop in at Buckeye Tools Corp. the other day and meet Colonel Melvourne J. McCombs, president of the company and the man whose ideas on labor relations and apprentice training have resulted in such a success. Back long before the war, the Colonel turned to totally inexperienced high school graduates, whom he interviewed and selected personally. They were given a thorough, rounded-out training, being advanced in pay through eighteen successive steps as fast as their attitudes and aptitudes indicated.

Then came the war and the draft began cutting into the group, so the Colonel turned to women, with a similar intensive training course. Only applicants who were totally inexperienced were considered, the Colonel doing the interviewing and hiring himself. Today, 75 per cent of the workers are women but the relationship of production to manhours still keeps spreading.

Cooperative effort on the part of management and labor spells success.

New Source

■ Newcomer to the field of company magazines is the *National Roll*, published by the National Roll & Foundry Co., Avonmore, Pa. It's a swell job and one that looks like it might run United Engineering's *United Effort* a close race for really good jokes, one of which undoubtedly will get swiped and appear here soon.

The Positive Method

■ Eugene D. Viers, president, Kondor Products Corporation, Cleveland, takes over on this matter of "Cigarettiquette" as follows:

We have made some observations ourselves and we have arrived at a few conclusions which we believe will go a long way toward helping the poor cigarette smoker. We believe that the customer is mainly to blame for the way he gets pushed around and the ill-mannered treatment he gets. He invariably goes up to the cigar counter and very timidly asks the question,—"You don't have any cigarettes, do you?"—at the same time shaking his own head. Now, that is a very easy question to answer and is usually answered in this way. "Can't you read the sign?"

One can always buy a pack of cigarettes at the drug store cigar counter IF HE first purchases say, a half dozen bottles of milk of magnesia, a carton of toilet paper, a lawnmower, a bottle of wine and a can of spinach. He never fails to find his particular brand at the delicatessen store, IF HE first purchases, two loaves of bread, three boxes of Wheaties, a large jar of pickles, a jar of mustard and two quarts of ice cream. (The bread, Wheaties, pickles and mustard also act as a kicker for the purchase of the ice cream.)

Another method which is not to be relied on too often for obvious reasons is the following: Walk up to the counter in a crowded store and ask, "Have you any cigarettes?" The answer is naturally, "NO!!" Then in a very loud and excited voice come back with, "what, nothing but Camels!" and at the same time make a quick shift either to the right or left to avoid being trampled to death in the panic which follows. The next time you go up to this counter, the clerk recognizes you and very quickly slips you a pack of some unknown brand of smokes at a premium price.

After careful study and experimenting with many methods of approach, we have developed the "Positive Method". Glowing with confidence, you walk right up to the counter and ask, "What kind of cigarettes do you have left?" This is always a difficult question to answer negatively and, after seriously considering lying to you—which is the last thing they would do, as evidenced by the evasion—"WHAT'S THE MATTER, CAN'T YOU READ!!!?"—they answer, "Well-Ah-Oh, Lady Hamiltons, Coffee Tones and Sour Dust". Now then, you have a choice; all high priced brands which you have never heard of before—high priced because they don't come under a previously established O.P.A. ceiling price. But that's another question. The important thing is that you get your cigarettes. Now, after several weeks of this routine, you gradually become a regular customer, then a preferred regular customer and then one morning the proprieter asks your name, address and telephone number. Brother, you have arrived because you are now in the exalted position of AA-1 priority consumer and, as such, are entitled to the brand of your choice.

We almost hesitate to mention the fact, inasmuch as some of our other dear readers may feel obligated, but Mr. Viers very nicely sent along sufficient evidence to prove that his "Positive Method" works.

Sound Your "A"

■ S.F.T.P.A.E.O.B.S.Q.S.I.A.I. is not a plate of alphabet soup nor the result of merging a few dozen Washington bureaus, but the initials of a new organization, which is not exactly sweeping the country but is spreading as fast as people can remember what all those letters stand for. The complete name is something like the Society for the Preservation and Encouragement of Barber Shop Quartet Singing in America, Incorporated.

Good Reading

■ If you haven't seen a copy of the little booklet, "A page of advertising is a page of advertising, no matter where it runs....." we believe you'll find it well worth your while to drop a note to The Associated Business Papers, 205 E. 42 St., New York 17, and say, "Please. That guy from STEEL says we should read it."

Vol. 116, No. 23, June 4, 1945, issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Editorial Contents—Page 69

Basifrit, the original quick-setting magnesite, is used in many open hearth shops as a standard hearth resurfacing refractory. A program of resurfacing regularly with Basifrit keeps old bottoms sound and clean.

FURNACE REFRACTORIES "DOCTOR"

DECREPIT old furnace bottoms, like sick old men, deserve expert attention.

Today there are hundreds of old open hearth furnace bottoms and electric furnace hearths that are operating on borrowed time. Some of them, in service for twenty-five or thirty years, or even more, are still hobbling along, doing praiseworthy duty in the prolonged program of war emergency steel production. It's no wonder they need careful nursing and expert doctoring.

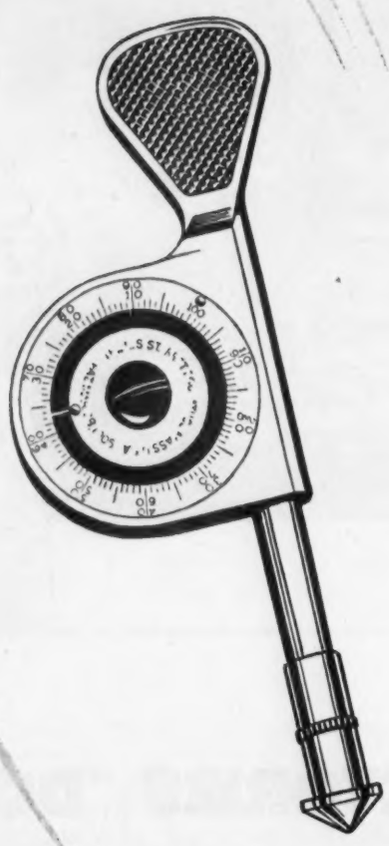
That's why we call the Basic Engineer your Furnace Refractories "Doctor". This "Doctor" is trained in the most efficient refractory practice. He is a graduate of the school of experience — the actual making of basic open hearth and basic electric furnace steel. He is prepared to diagnose the ills of ailing old furnace bottoms and linings and prescribe first aid or more permanent treatments.

He can help you with major or emergency hearth repairs. He can help you set up resurfacing programs with Basifrit, where old bottoms are sound underneath, which will not only cut delay time, but protect or improve steel quality, too. Or he can help you establish improved fettling practice with Magnefer or Syndolag, or economical, time-saving sidewall maintenance programs with Gunmix.

Then later, when you can spare the time, the "Basic" Sales Engineer can help you plan a complete rehabilitation program—to install new hearths of Ramix in old furnaces you are rebuilding, so that for postwar you can make steel once more with least loss of time, least trouble, and at minimum refractory cost.

BASIC REFRACTORIES, INCORPORATED 845 HANNA BUILDING *Cleveland 15, Ohio*

SPEED



ABRASIVE Rate of Speed is important for successful grinding at lowest cost. Work-carriage speed, work speed and wheel speed are all closely related to grinding wheel selection and economy.

In the Abrasive Company complete line of Grinding Wheels, thousands of combinations of abrasive types, grain sizes, grades, structures and bond types, meet all essential requirements, with due consideration to correct ratio of work speed to wheel speed.

Every Borolon (aluminum oxide) and Electrolon (silicon carbide) Grinding Wheel is manufactured under strict laboratory control, checked by scientific tests and rigid inspections. The identifying blotter on every wheel is your assurance of the accuracy of specification and top grinding performance when wheels are properly selected.

Abrasive Company Distributors stock or can make available a wide variety of Borolon and Electrolon Grinding Wheels; Segments; Mounted Wheels and Points; Grains, Bricks and Sticks. If you do not have the Abrasive Company 120 Page Grinding Wheel Data Book, a copy will be mailed on request.

Borolon and Electrolon Grinding Wheels are tested according to the Safety Code of the American Standards Association. Wheels are tested on special machines at speeds greater than their maximum operating speeds. Test and Maximum operating speeds are marked on wheels.

abrasive Company

Division of Simonds Saw and Steel Company

ABRASIVE COMPANY, PHILADELPHIA 37 • DISTRIBUTORS IN ALL PRINCIPAL CITIES

NORTHWEST *Performance* on RUBBER TIRES

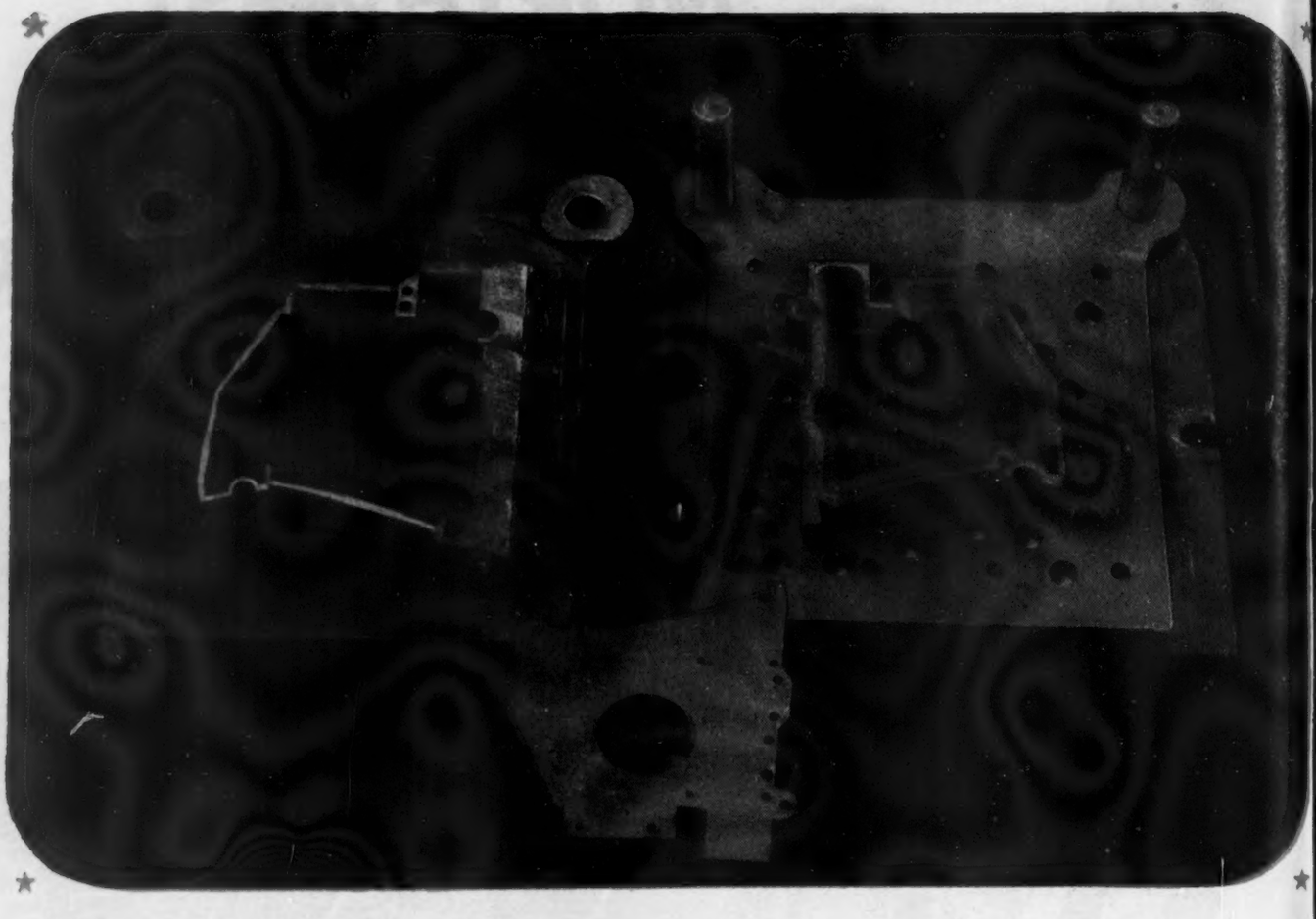
When you think of Truck Mounted shovels, cranes and draglines, think of NORTHWEST. Northwest Truck cranes and Truck shovels bring you the advantages characteritsic of Northwest crawler equipment—advantages that mean better Truck crane and shovel performance.

Northwest Truck cranes bring you Northwest simplicity of design that cuts upkeep costs, the "feather-touch" clutch control for fast, smooth, easy operation, the cushion clutch that helps to make ample power safer and reduces the overloads on all parts under power, the uniform pressure swing clutches that take the nerve wracking jerks out of swinging, ball and roller bearings on all high speed shafts, the helical gear drive and many other Northwest features that have been proved in years of service on the big jobs of the country.

If you need truck mobility and want the smooth performance and high output for which Northwests have always been famous, check up on Northwest for your future plans.

NORTHWEST ENGINEERING CO.
1805 Steger Bldg., 28 E. Jackson Blvd.
Chicago 4, Illinois

NORTHWEST for TRUCK CRANES



HOW TO *Cut Costs and "Corners"* ON YOUR BLANKING DIES

You can save steel and time in the making of dies for blanking, trimming, beading, or any application involving the cutting of sheet metals to regular or irregular shapes, by assembling them from FCC Composite Steel Die Sections.

These prefabricated die parts consist of fine tool steel cutting edges, in a selection of grades, electrically welded by a special process to non-hardenable mild steel bases. Thus, screw and dowel holes may be easily drilled after heat treating, and there are numerous other advantages that will be immediately obvious to the die maker.

Thousands of die shapes may be made up from combinations of thirty-five standard sections. Specially shaped sections are manufactured to customers' specifications in five to ten days.

Prompt delivery under CMP.

WRITE FOR ENGINEERING DATA

It contains a print showing the various standard shapes available for quick shipment, and explains how to order special shapes, including rib-reinforced extra high sections. It also contains prices. Get your copy—write for it today.

ADDRESS DEPT. S-35

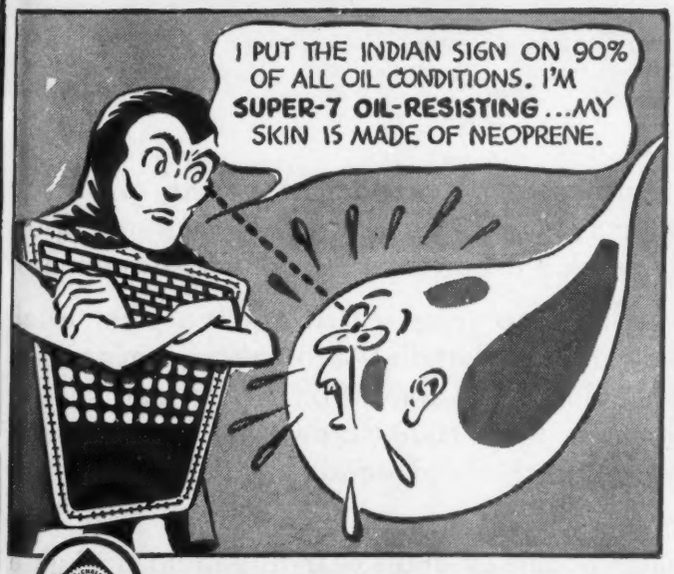
Allegheny Ludlum
STEEL CORPORATION
Forging and Casting Division
DETROIT 20, MICHIGAN

W & D 9477

HOODOO SMASHERS!

America's newest and widest line of V-Belts — Allis-Chalmers' Texrope — solves problems that have hoodooed drives in almost every industry . . . see what they can do for you!

I ROUT THAT OLD BUGABOO, STATIC ELECTRICITY. I'M STATIC-RESISTING SUPER-7. MY BUILT-IN CONDUCTING ELEMENT CARRIES CHARGES TO THE MACHINE WHERE THEY'RE GROUNDED



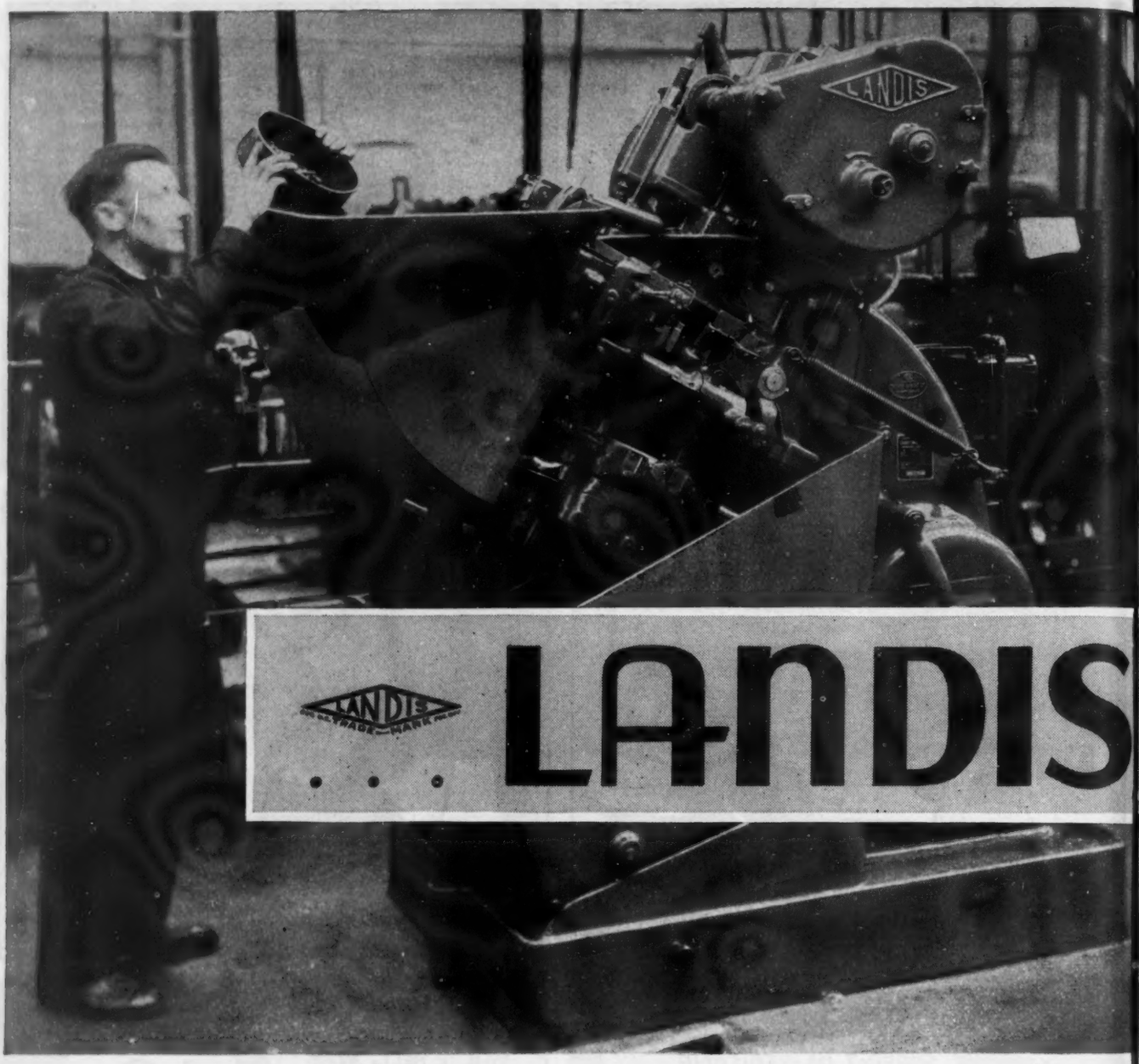
A 1861

♪ *Tune in the Boston "Pops", Blue Network, every Sat. Eve.*

IT PAYS TO MAKE **ALLIS-CHALMERS** YOUR

V-BELT DRIVE HEADQUARTERS

Texrope Super-7 V-Belts result from the cooperative research of two great companies—Allis-Chalmers and B. F. Goodrich—and are sold exclusively by A-C.



LANDIS
REG. U.S. PAT. OFF. TRADE-MARK

. . . LANDIS

The Landis Automatic Forming and Threading Machine gives you maximum operating efficiency at low threading cost, since one operator and a helper easily service a battery of six or eight machines.

Results obtained in threading cap screws illustrate the production which may be expected with the Landis Automatic Forming and Threading Machine—threading 7/16 dia. 20 pitch N.F. cap screws made from alloy steel, more than 1000 screws are pointed and threaded per hour with one machine. Threads are held to Class 3 specifications.

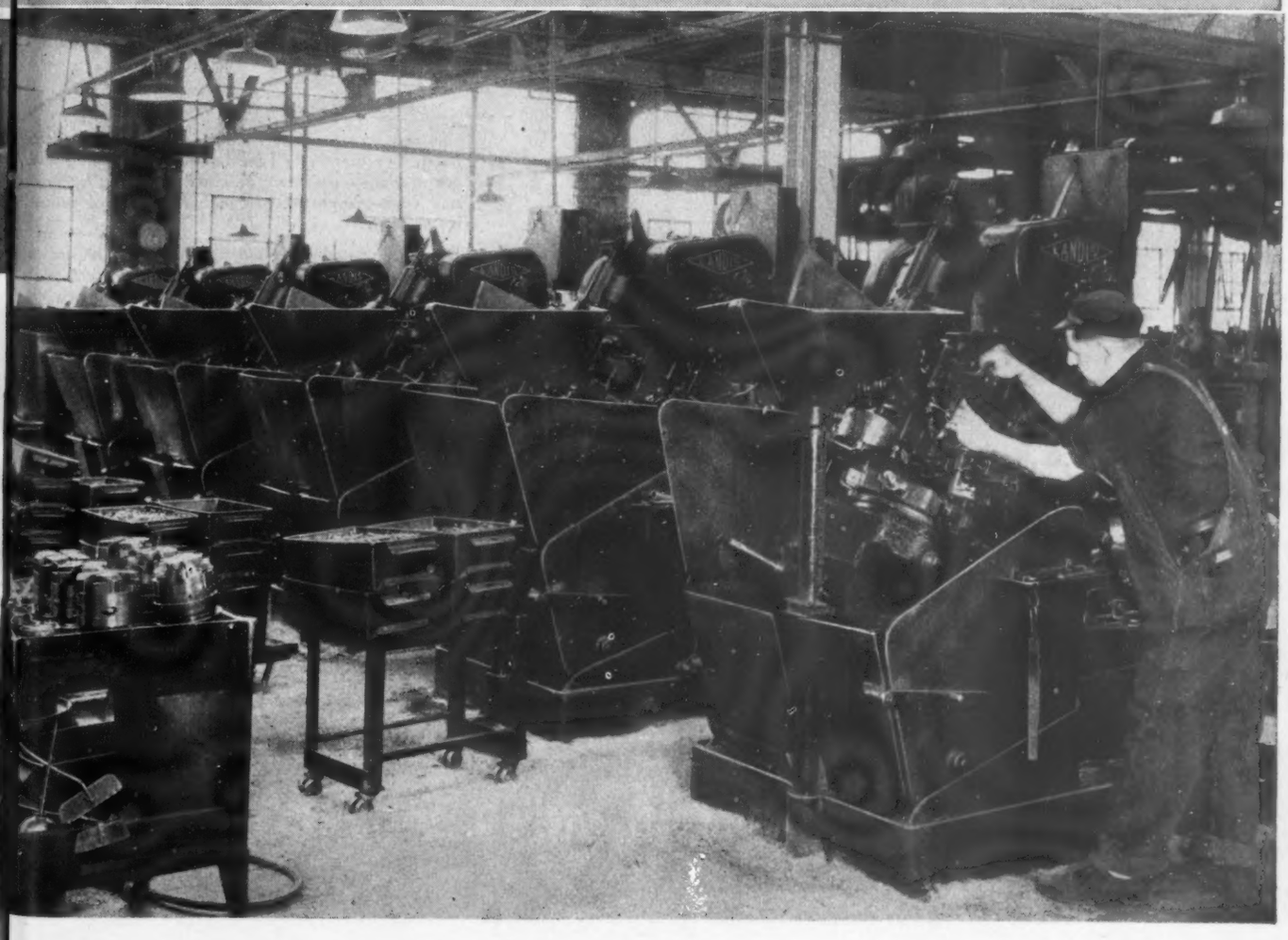
For more production, finer accuracy and lower threading cost, use the Landis Automatic Forming and Threading Machine.

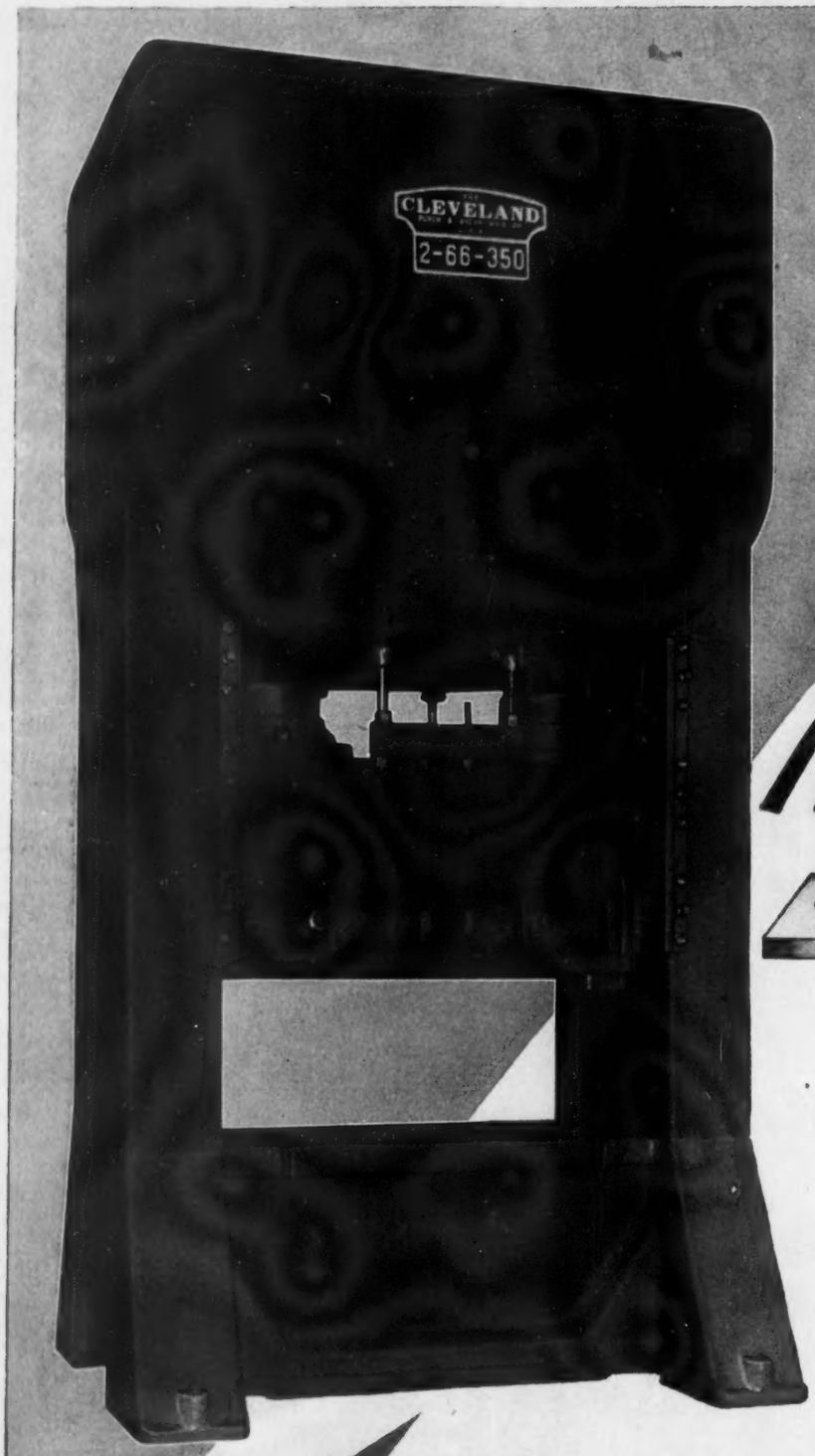
Bulletin E-70 will be sent upon request

More Production
Finer Accuracy

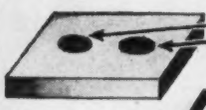
WITH THE LANDIS AUTOMATIC FORMING AND THREADING MACHINE

MACHINE CO. WAYNESBORO PENNA. U.S.A.





Modern



2 POINT PRESSES

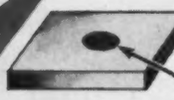
This series of rugged, streamlined Cleveland Single Point, Two Point and Four Point Presses, being modern in every respect, are designed for speed, accuracy and ease of operation in the production of pressed metal parts.

It will be noted from the accompanying illustration that all over-hanging brackets and other projections have been eliminated by installing all gears, flywheel and drive unit in the box type crown, a feature which not only contributes to greater safety but also saves valuable overall floor space.

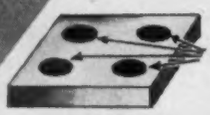
Furthermore, instead of the jaw type of Clutch, with which most mechanical presses are usually equipped, these Modern Cleveland Presses can be furnished with either a hydraulic or pneumatic friction clutch and brake, arranged with electric push button control having one or more stations.

If you are interested in Presses designed to produce metal stampings with greater accuracy and economy, write for a copy of our "Modern Press" catalog.

The Press illustrated is a Modern Cleveland Two Point which has a connection at each side of the slide. It has a capacity of 350 tons, bed area 40" x 66", stroke 16", adjustment 5", and operates at the rate of 15 strokes per minute.



Also
SINGLE POINT
and



4 POINT PRESSES

THE CLEVELAND PUNCH AND SHEAR WORKS COMPANY
CLEVELAND, OHIO

This microscopic view, magnified many times, illustrates the "toothed" surface of Superior Galvannealed steel sheets. A special heat treating process produces this ideal foundation for taking and holding paints and fine finishes.

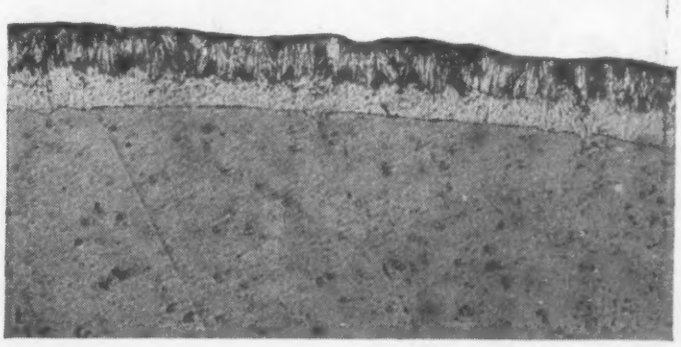
CLOSE-UP: WHY SUPERIOR GALVANNEALED IS THE RIGHT STEEL SHEET FOR MANY APPLICATIONS

Superior Galvannealed
TRADE MARK

The micro-photographs reproduced on this page show Superior Galvannealed's unusual physical properties. They show why this highly rust-resistant, zinc-coated steel sheet "takes" paint and fine finishes readily and "holds" them longer.

The ability of Superior Galvannealed to add lasting good appearance to a product, *and* save time and expense during manufacture, has made it a favorite for many war applications. In peacetime, manufacturers use it for a wide range of products, including refrigerators, heating and air-conditioning units, washing machines, and truck bodies. Write for additional information about Superior Galvannealed.

This microscopic photograph of a cross section of Superior Galvannealed shows the alloy bond between the coating and base steel. This bond guards against rust forming under the paint, and gives extra life to the finish and sheet itself.



THE SUPERIOR
SHEET STEEL COMPANY - CANTON, OHIO

PRODUCERS OF STEEL SHEETS, including SUPERIOR Galvanized, Tite and Extra Tite Coat Galvanized, CHECKERCOAT, LASTI-KOTE, COPPERIOR (copper steel base), SUPERIOR Galvannealed, SUPER METAL, SUPERIOR Long Ternes (drawing quality), Hot Rolled Annealed, Hot Rolled Annealed Pickled, Pickled Blue, Deoxidized, and Standard Types of Galvanized Formed Roofing.

DIVISION OF CONTINENTAL STEEL CORPORATION • GENERAL OFFICES, KOKOMO, INDIANA

IF IT'S AN ABRASIVE TOOL . . . "CARBORUNDUM" MAKES IT!

EVERY once in a while, somebody tells us that the reason he's not using an Abrasive by "CARBORUNDUM" on a particular job is because "CARBORUNDUM" doesn't make an abrasive product for that job. That always surprises us. For actually there's an abrasive product by "CARBORUNDUM" for all abrasive applications used by modern industry. You see, The Carborundum Company pioneered the use of man-made abrasives. For over half a century, "CARBORUNDUM" abrasive engineers have been working with tool and production engineers and others in industry to help perfect better ways of doing things through the effective use of abrasive tools.

Today, Abrasives by "CARBORUNDUM" are used in almost every industry and for a multitude of purposes. Many users specify these products for all their requirements. Whenever you need help with your abrasive problem call the "CARBORUNDUM" representative. The Carborundum Company, Niagara Falls, N. Y.

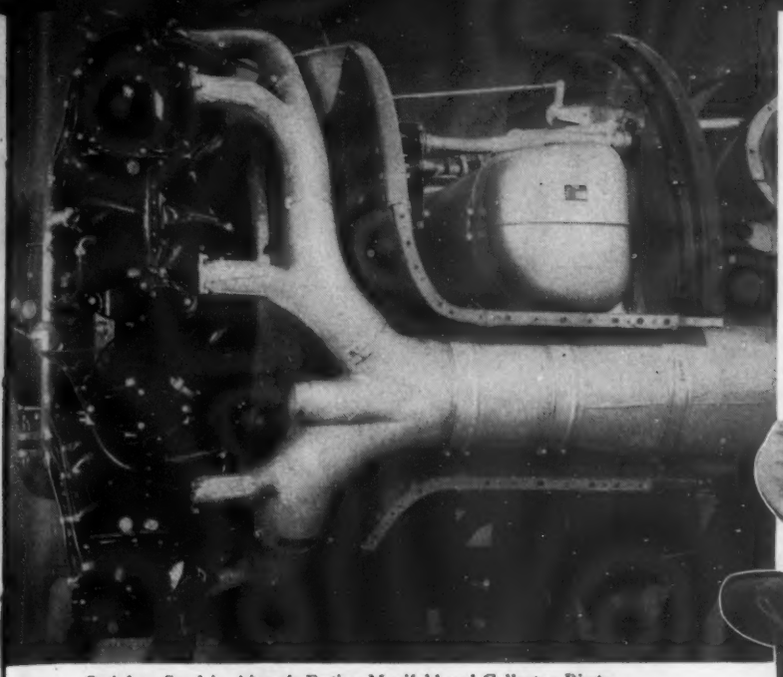
THERE IS A PRODUCT BY

CARBORUNDUM

TRADE MARK

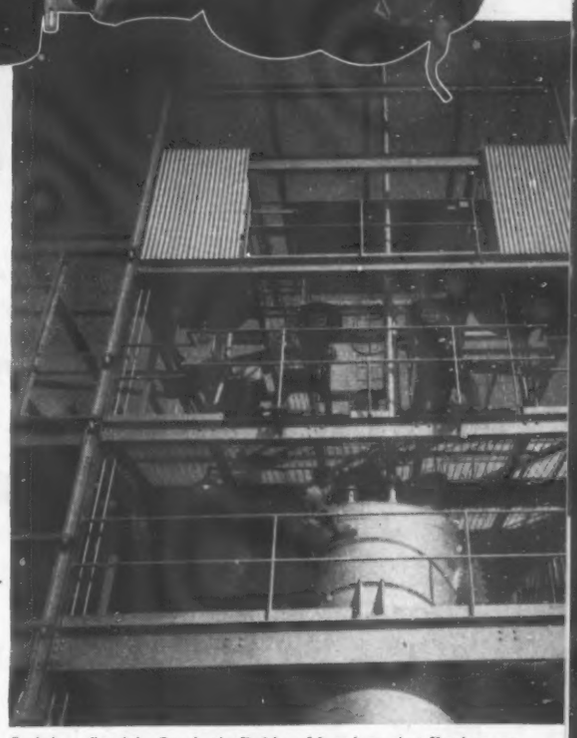
FOR EVERY ABRASIVE APPLICATION

("CARBORUNDUM" is a registered trade mark of and indicates manufacture by The Carborundum Company)



Stainless Steel in Aircraft Engine Manifold and Collector Rings

Stainless Steel Army Mess Kits



Stainless Steel in Synthetic Rubber Manufacturing Equipment

WE HAVE LARGE STOCKS OF

STAINLESS STEEL...

CALL US FOR *Quick Service!*

WE have been able to build up our warehouse stocks of U·S·S Stainless Steel. They include sheets, plates, bars of all kinds—rounds, squares, hexagons and angles—pipe, tubing, and welding electrodes in all standard grades and specifications. And every pound of U·S·S Stainless Steel has been made by specially trained personnel in plants particularly adapted for its manufacture. In STAINLESS, as in other steels, the letters "U·S·S" are your assurance of top quality.

Hundreds of new uses for Stainless Steel have been discovered in the course of production for war. Perhaps we can help you use it to advantage. Our engineers will assist you in selecting the proper type of U·S·S Stainless Steel for your requirements and will help you with fabricating problems. And we'll be glad to send you free technical bulletins upon request.

PHONE, WRITE OR WIRE our nearest warehouse when you need Stainless Steel. A call to us may help you avoid serious delay in vital war production. We are doing our best, under today's difficult conditions, to maintain our reputation for quick service. Your orders and inquiries will receive courteous attention and prompt action.

UNITED STATES STEEL SUPPLY COMPANY

CHICAGO (90) 1319 Wabansia Ave., P. O. Box MM—BRUnswick 2000
BALTIMORE (3) Bush & Wicomico Sts., P. O. Box 2036—GILmore 3100
BOSTON (34) 176 Lincoln St., Allston, P. O. Box 42 STAdium 9400
CLEVELAND (14) 1394 E. 39th St., HEnderson 5750
MILWAUKEE (1) 4027 West Scott St., P. O. Box 2045—Mitchell 7500
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TWIN CITY 2545 University Ave., St. Paul (4), Minn. NEstor 2821

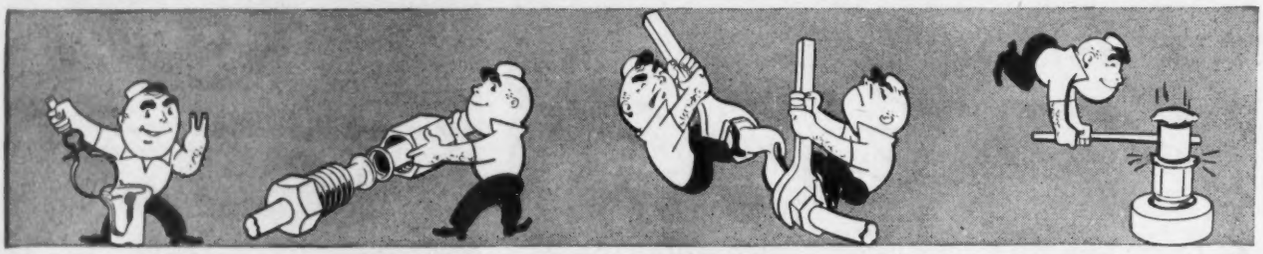
UNITED STATES STEEL SUPPLY COMPANY
USS
STEELS
SERVICE

UNITED STATES STEEL

BUNDY DOUBLE FLARE

A Perfect Combination with Bundyweld Steel Tubing

THE DOUBLE FLARE... FOR LEAK-PROOF, PRESSURE-PROOF JOINTS...



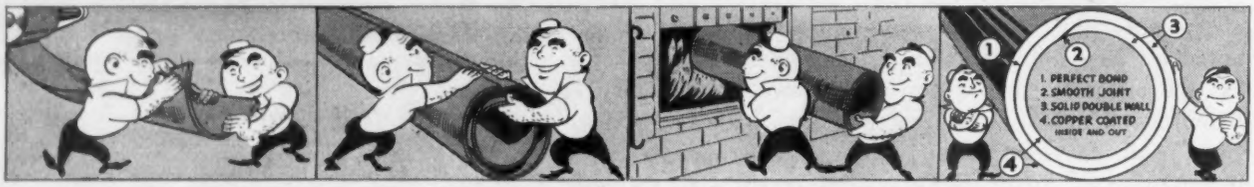
GIVES almost twice the amount of metal at the seat.

PERMITS frequent removal and replacement of fittings.

SAFELY permits over-torqueing. Held to close tolerance.

CAN be made either by hand or with machine tools.

WITH BUNDYWELD ... THE SOLID, DOUBLE WALL STEEL TUBE



1 Bundyweld Tubing is made by a process entirely different from that used in making other tubing. A single strip of copper-coated S.A.E. 1010 steel is continuously rolled twice laterally...

2 ..into tubular form. Walls of uniform thickness and concentricity are assured by the use of close tolerance cold rolled strip. This double rolled strip passes through a furnace where the . . .

3 . . copper coating fuses and alloys with the double steel walls. After brazing and cooling, it becomes a *solid* double wall steel tube, copper brazed throughout 360° of wall contact . . .

4 . . copper coated inside and out, free from scale, and closely held to dimensions. Hard or annealed in standard sizes up to 5/8" O.D. Special sizes cold drawn. Also furnished in Monel.

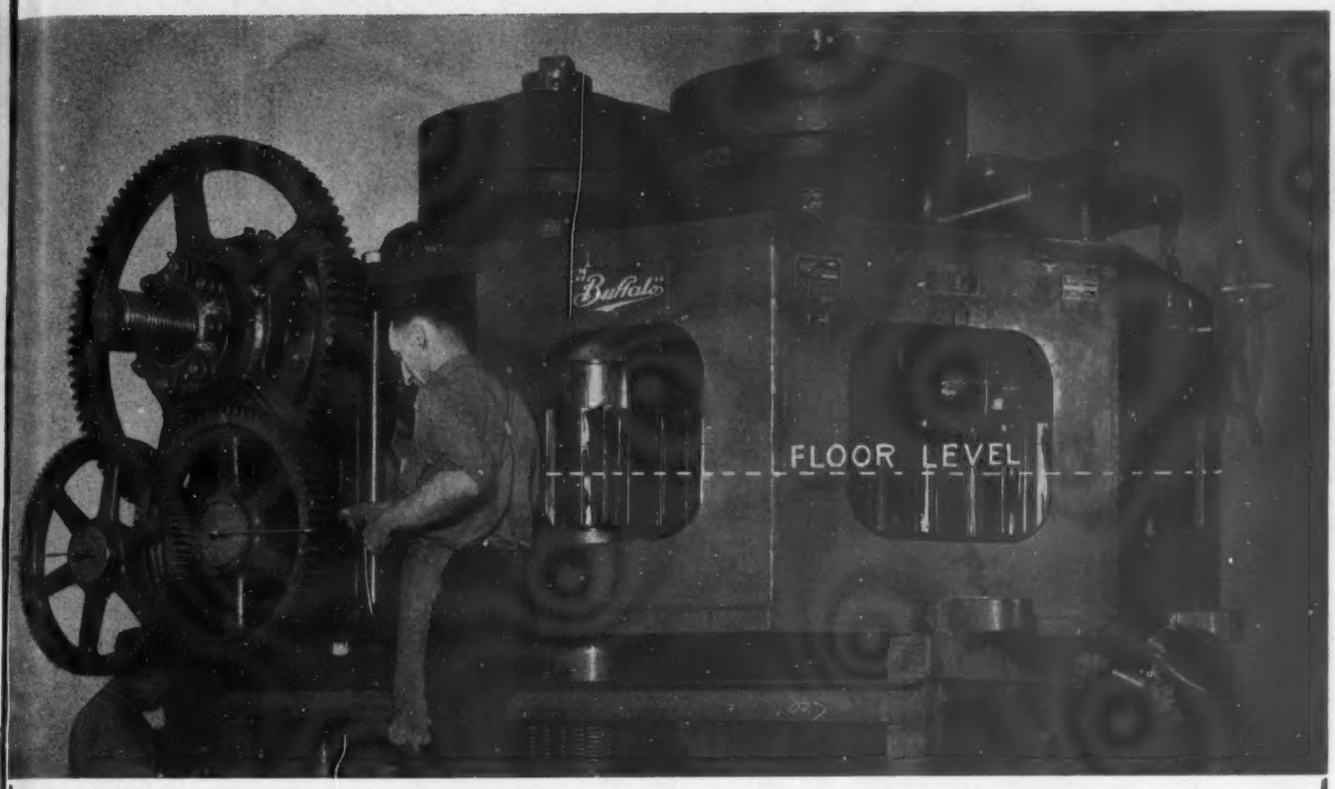
For further information, write Bundy Tubing Co., Detroit 13, Mich.

BUNDY TUBING

ENGINEERED TO YOUR EXPECTATIONS

BUNDY TUBING DISTRIBUTORS AND REPRESENTATIVES:

Pacific Metals Company, Ltd. 3100 19th Street San Francisco 10, California	Standard Tube Sales Corp. 1 Admiral Avenue Maspeth, New York City, N. Y.	Lapham-Hickey Company 3333 W. 47th Place Chicago 32, Illinois	Rutan & Company 112 South 16th Street Philadelphia 2, Pennsylvania	Eagle Metals Company 3628 East Marginal Way Seattle 4, Washington



Big Machines to do a big job

This illustration of a Buffalo No. 4 Horizontal Bending Roll receiving final adjustments on our assembly floor, gives a good idea of the rugged construction required for a machine of this type.

This No. 4 Bender is now in service, bending 8" x 8" x 1" angles, cold, into 108" circles. Other capacities, on the same machine, are 15"-60 lb. beams; 15"-55 lb. channels; 8" x 1½" flats on edge, 12" x 3" flats on flat, 5" rounds, 4½" squares, 8" standard steel pipe, etc., etc. (Each shape, of course, requires rolls to fit.)

While your work may not require a bending roll of this capacity, the "know-how" which builds this machine is available to you on the smaller models. Bulletin 352-B gives complete details and capacities on the entire Buffalo line.

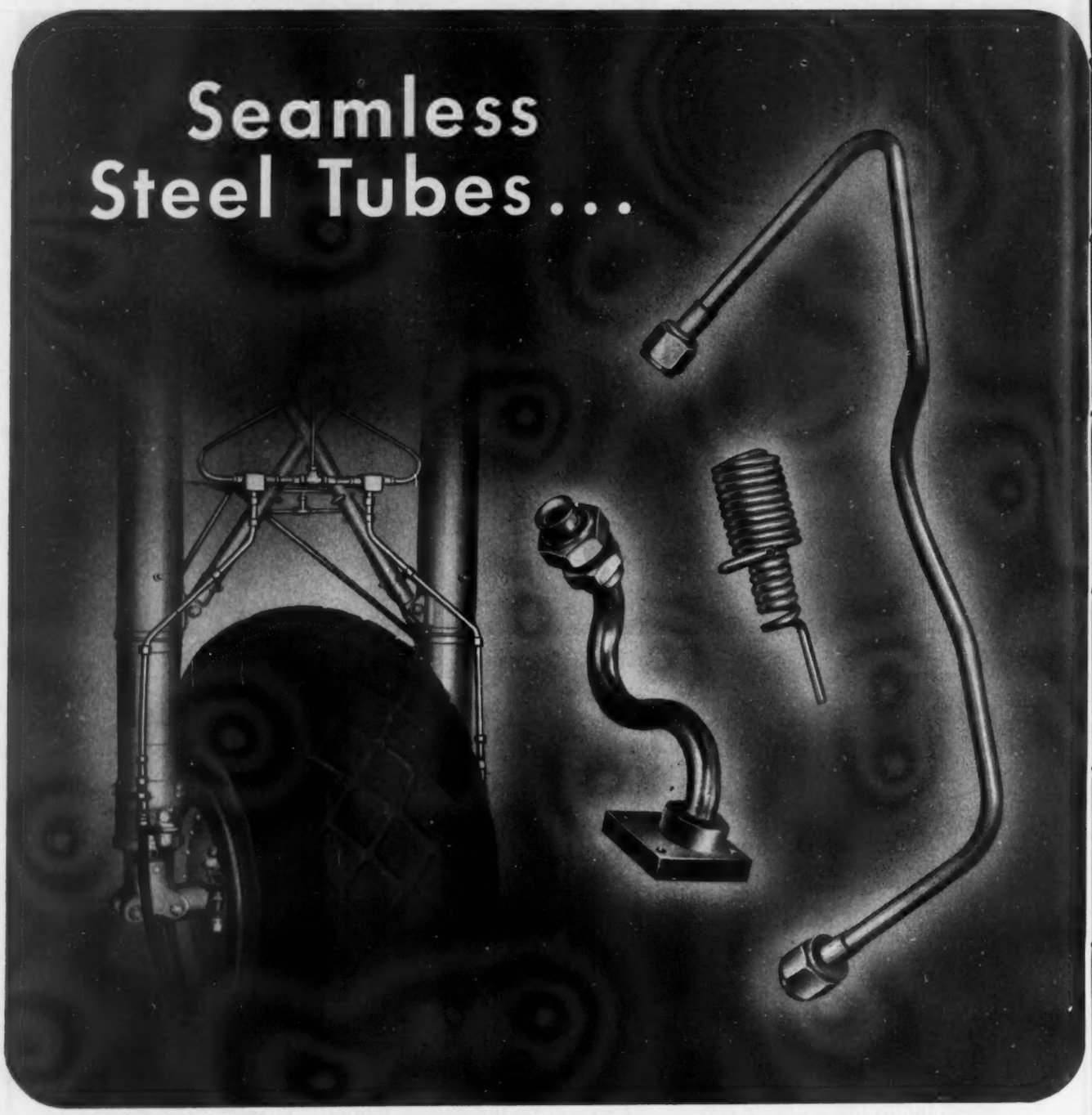
"Buffalo"

Buffalo Forge Company

158 Mortimer Street **Buffalo, N. Y.**

Canadian Blower & Forge Co., Ltd. Kitchener, Ont.

BENDING ROLLS



Gives Many Extra Advantages in Pressure Lines

By using seamless steel tubing for pressure lines, product designers can be sure of adequate strength for high pressures and the sharp shocks of sudden starts, stops and reversals in machine tool and similar applications.

Also gained are such additional advantages as: Easy bending • Strong leakproof connections • High resistance to vibration fatigue • Free flow of fluid and no turbulence as result of smooth inside surfaces • Ease of service in the field.

Michigan technical counsel on the uses of tubing is available to you.

A sturdy, pocket-size card, combining Decimal Equivalents and Hardness Conversion Tables will be sent upon request. Ask for one or more copies of the "Equivalents Card."

MICHIGAN TUBING

MICHIGAN SEAMLESS TUBE COMPANY

SOUTH LYON • MICHIGAN

ARMY E NAVY

Awarded Feb. 12, 1943
First Star Sept. 9, 1943
Second Star May 27, 1944
Third Star Dec. 2, 1944

SPECIFY "GENERAL CHEMICAL"

...dependability and uniformity in metal chemicals

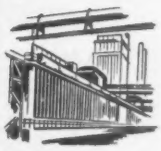
STEEL

PICKLING . . . Sulfuric Acid—Hydrofluoric Acid—Muriatic Acid—Nitric Acid—Phosphoric Acid—Chromic Acid.

Detergents: Sodium Metasilicate—Trisodium Phosphate—Sodium Silicate—Tetrasodium Pyrophosphate.

RIMMING STEEL . . . Sodium Fluoride for smoother surface rimming steel.

COKE BY-PRODUCTS . . . Sulfuric Acid for making Ammonium Sulphate; for washing toluene, benzene, and for treating light oils.



FOUNDRY

Casting Cleaning Acid (Hydrofluoric Acid)—Sodium Silicate—Zinc Chloride—Polyacid Fluorides—Chromic Acid.

Sodium Fluoborate—Ammonium Fluoborate—Potassium Fluoborate, antioxidants and inhibitors.

Potassium Fluoride—Lithium Fluoride and other welding fluxes.

Fluoboric Acid: Solvent for silica, in cleaning surfaces.

HEAT TREATING

Sodium Cyanide—Sodium Fluoride—Sodium Cyanate—Potassium Cyanate.

METAL and ALLOY PLATING

Lead Fuoborate—Tin Fluoborate—Zinc Fluoborate—Cadmium Fluoborate—Copper Fluoborate, etc.

FOR METAL ANALYSES: **BAKER & ADAMSON REAGENTS AND FINE CHEMICALS**

GENERAL CHEMICAL COMPANY
40 RECTOR STREET, NEW YORK 6, N. Y.

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BASIC CHEMICALS

GENERAL CHEMICAL COMPANY

FOR AMERICAN INDUSTRY

IF YOU CAN'T GO THROUGH THE PLANT BE SURE YOU GO THROUGH THIS BOOK

• The best way to know a steel forging is to see it made. But rather than wait until you have the opportunity to come to Irvine, National Forge brings the plant to your desk in this new "how we do it" booklet.

The processes pictured in this book plus their factual descriptions, make it a timely work of helpful value to every designer or buyer of steel forgings. Your copy will be mailed, without charge of course, if you simply ask for it now.

NATIONAL FORGE & ORDNANCE CO.

IRVINE, WARREN COUNTY, PENNA.

"WE MAKE OUR OWN STEEL"

Announcing Oakite

TRI-SAN

It Kills Odors . . . Disinfects . . . Cleans Surfaces!

Simultaneously Does ALL 3 in ONE Low-Cost Operation

Designed to simplify and increase the effectiveness of plant hygiene procedures, Oakite TRI-SAN is a basically NEW development combining the functions of (1) deodorizing; (2) disinfecting surfaces; and (3) removing light soils from surfaces . . . ALL in ONE material. It may be used practically any place where good housekeeping and sanitation are recognized as a safety precaution that pays dividends in increased employee health protection and in improved working conditions.

Gives You Triple Sanitizing Action For One Cent a Gallon!

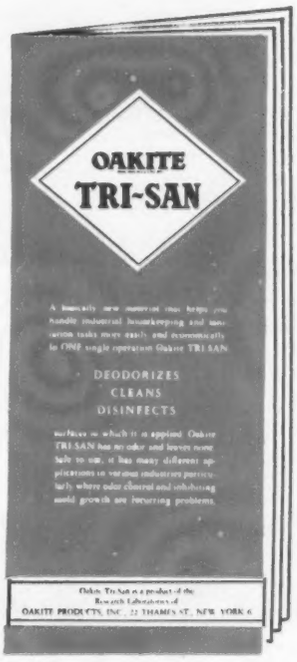
Many advantages accrue from the use of Oakite TRI-SAN. It saves time because it performs its work quickly and with surprising thoroughness. Manhours are conserved because its triple-action on surfaces helps make every sanitation and odor control task easier. And it has the added feature of LOW COST. Oakite TRI-SAN solutions are so economical to use that for most tasks, you obtain a deodorizing, disinfecting and cleaning solution for only ONE CENT a gallon.

WHAT Is Oakite TRI-SAN?

It is a mildly alkaline, free-flowing white powder, completely soluble in water, forming a clear, colorless solution. It contains no hypochlorites or iodine, no caustics, no phenol or mercurial type compounds or heavy metals, no volatile solvents or corrosive ingredients. The safety factor of Oakite TRI-SAN solutions, from a use and handling standpoint, is one of its outstanding features. Solutions of Oakite TRI-SAN have NO odor . . . and leave none.

Oakite TRI-SAN Is Easy to Use and Apply

Oakite TRI-SAN may be used in either cold or warm water. Warm or hot water accelerates its germicidal and odor destroying action. You merely add Oakite TRI-SAN to water in recommended concentration and stir for a moment to dissolve all ingredients. Solutions are applied directly to surfaces with brush, mop, cloth or sponge.



WHERE to Use Oakite TRI-SAN

The triple sanitizing action of Oakite TRI-SAN may be advantageously employed in factories, mills, shops and in various lines of business where odor control and sanitizing tasks are performed daily in connection with plant washrooms, locker and rest rooms, first aid rooms, toilet bowls and seats, urinals, shower stalls, wash fountains, plant cafeterias, floors, walls, woodwork. Also for destroying obnoxious odors in drains, storage areas.

Free 20-page Booklet Gives You Complete Story

This interesting, unique booklet, just off the press, describes the many different applications of Oakite TRI-SAN in various industries. It gives case-histories, formulae and directions for using. Plant executives, safety supervisors and engineers, maintenance superintendents and others will find it a valuable guide to improved plant sanitation. Write for your FREE copy today. It will be mailed promptly upon receipt of your request.

Oakite Products, Inc., 26 Thames Street, New York 6, N. Y.

Technical Service Representatives Located in All Principal Cities of the United States and Canada

FORGINGS

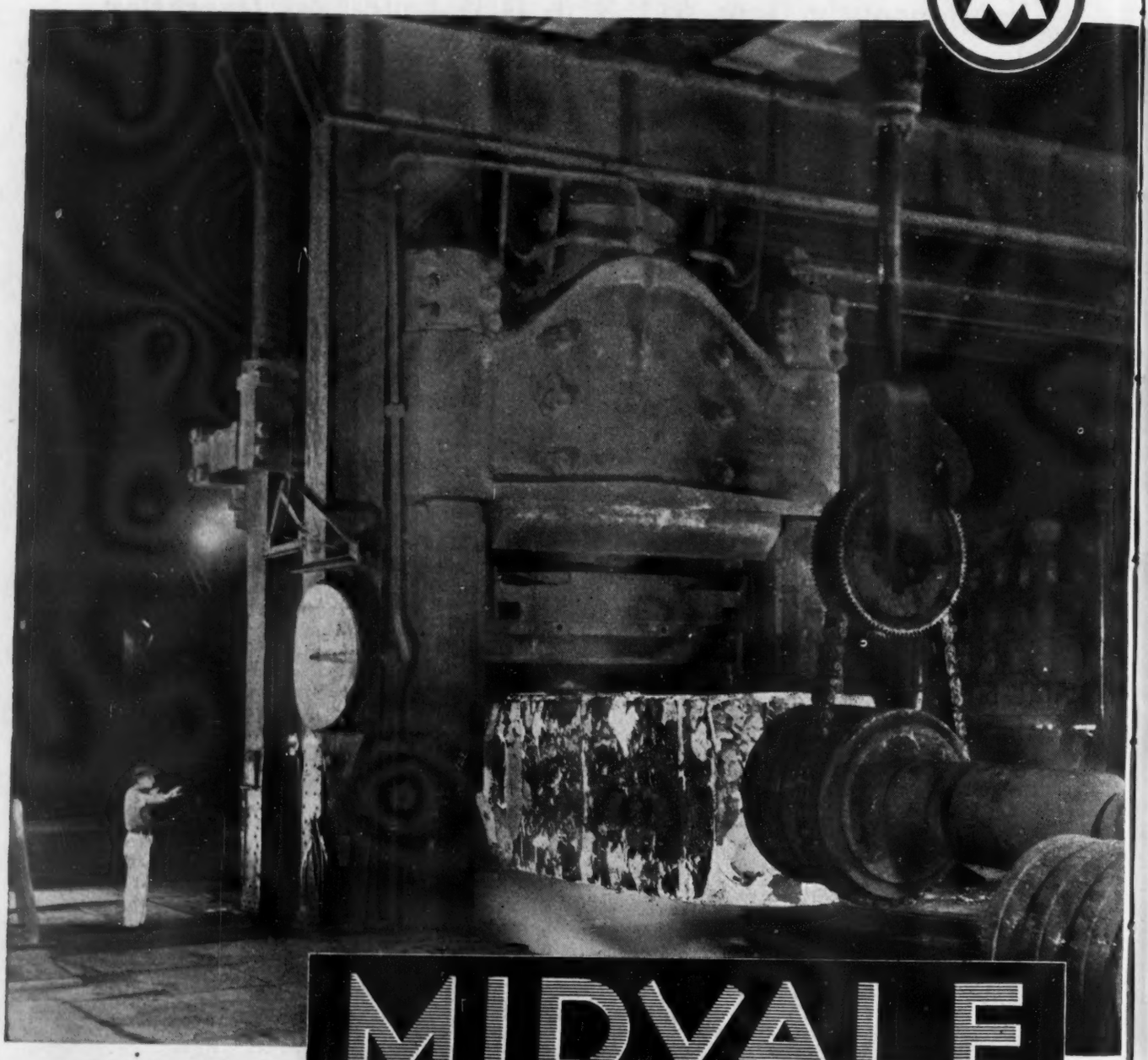
Two of the essentials of good forgings are experience and equipment. More than 75 years of practical steel-making are summed up in Midvale reputation. And Midvale has created installations to handle forgings of any size

Both of these factors are particularly important when forgings are designed to withstand the stresses in modern machinery. The reliability inherent in forgings must be assured by adherence to the best practice.

Midvale welcomes forging jobs that are tough and unusual.

THE MIDVALE COMPANY • NICETOWN • PHILADELPHIA

OFFICES: NEW YORK • CHICAGO • PITTSBURGH
WASHINGTON • CLEVELAND • SAN FRANCISCO

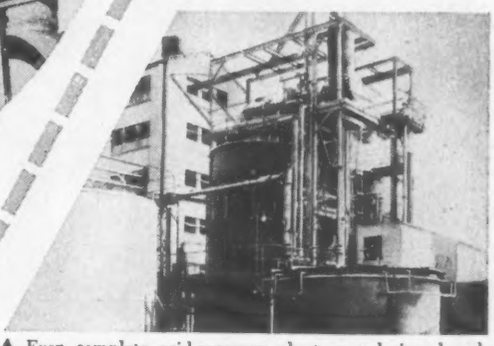


MIDVALE

Custom Steel Makers to Industry

Make Acid Toe The Line

This precipitator for the abatement of industrial fumes near residential areas was installed by Derkiss Lead Burning Contractors, Linden, N.J. Chemical lead sheets, burned together and supported on skeleton steel frames, form the tanks. Total lead used, 41,000 pounds.



Even complete acid-recovery plants are designed and built by National Lead. These feature the patented Simonson-Mantius Process with its advantages of low temperature and high yield.

From Plant to Equipment to Pipe

Whatever you need in lead—*Go National.*

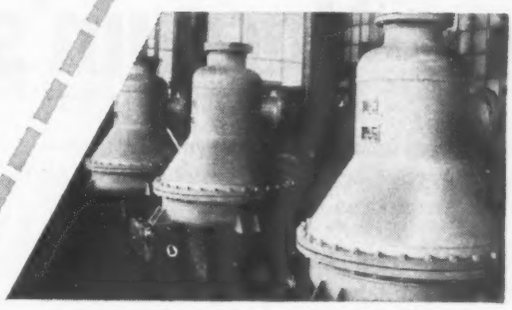
Do you need lead sheet, pipe, coils, valves, flanges, traps, bends? *Go National for Lead.*

Do you need chemical, antimonial, tellurium, or tellurium-antimonial lead? For example, do you need Tellurium Lead's corrosion resistance at elevated temperatures and its ability to withstand vibratory stress? *Go National for Lead.*

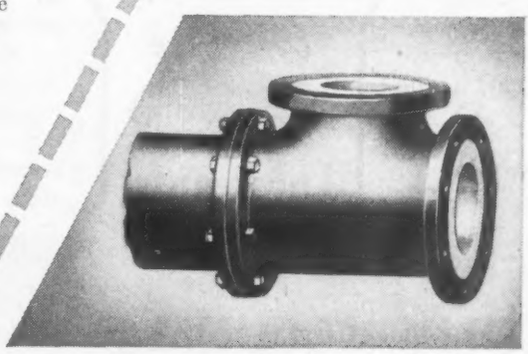
Do you need lead-lined or lead-covered acid valves, pipe, coils, or special lead-lined apparatus fabricated to specification? *Go National for Lead.*

Or do you require a complete sulfuric acid recovery plant, with everything supplied, from the plan right down to the last detail of construction? *Go National for Lead.*

Most important of all, do you need the years of experience which National Lead has accumulated from thousands of lead installations in every field handling corrosive solutions and gases? *Go National for Lead.*



Where high steam pressure, vacuum, vibration, shock and rapid temperature change are encountered, as in evaporators, autoclaves, pressure stills, heating and cooling coils and agitators—look into our homogenous lead-lined or lead-covered equipment.



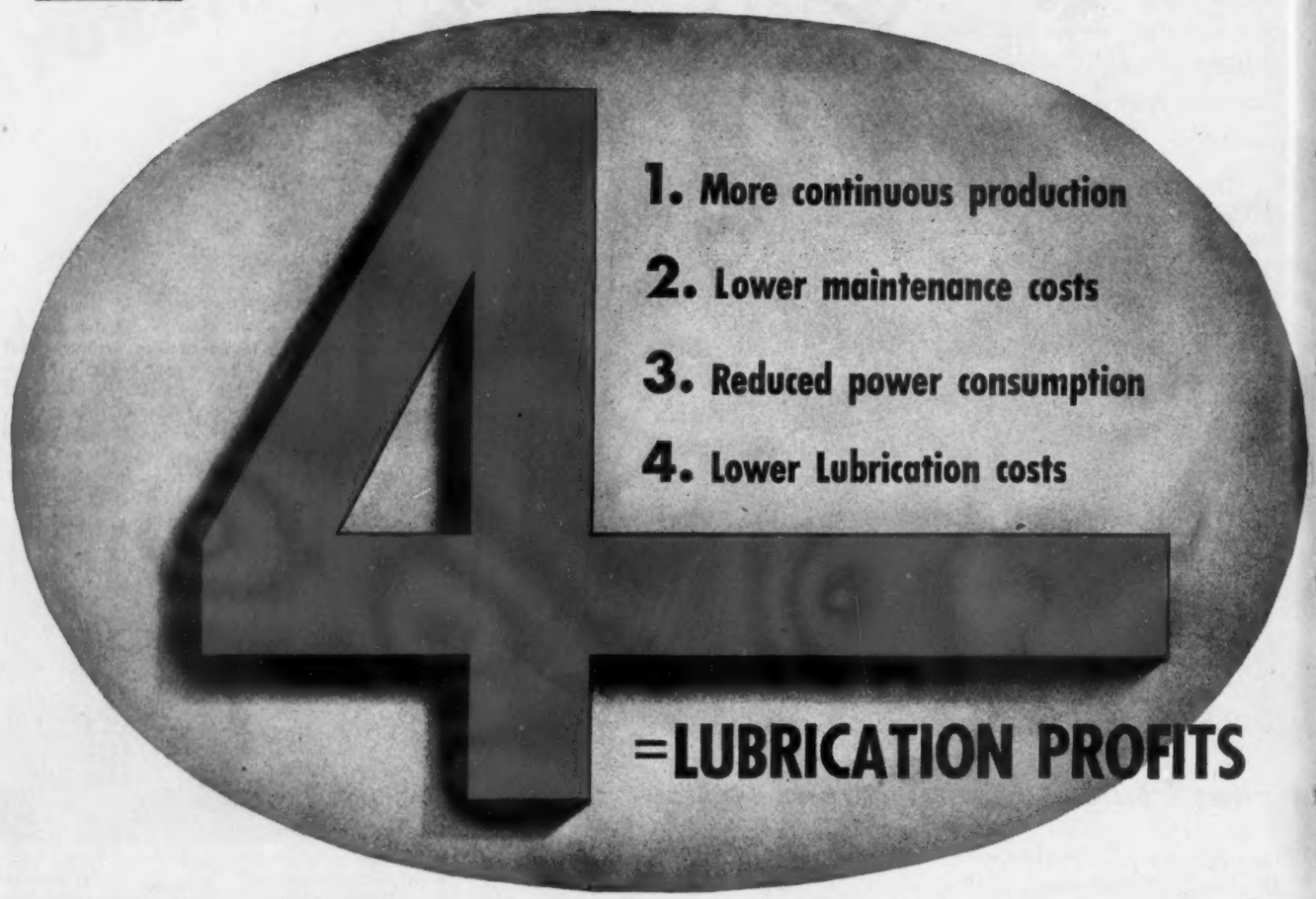
When high pressures plus corrosion must be licked, investigate National Lead's lead-lined pipe and fittings. Made of steel or iron, the pipe is lined with seamless chemical lead tube, bonded by our special "Tubond" process.

Go "National" for Lead

National Lead Company

111 Broadway, New York 6, N. Y. *Offices and Plants in Principal Cities and Canada*

Your 4 Best Oil "Specifications"



Socony-Vacuum's 4-Factor Story

☛ No matter what machines you operate—you'll find that your best specifications for oil or grease are *ultimate results.*

☛ You're not interested in the oil or grease as such. You're after continuous production, uninterrupted by machine failure. You want lower maintenance costs from maximum machine protection, reduced power consumption from lower frictional losses and, finally, you want lower lubrication costs.

☛ In short, what you want are the 4 factors of Socony-Vacuum Correct Lubrication—the 4 factors that add up to lubrication profits for your plant.

☛ You can get these 4 factors now with Socony-Vacuum's *complete lubrication program* for your plant. For this program not only means the best quality lubricants for specific needs, but also includes skilled engineering counsel for scientific application, latest storage and handling methods, charts, controls and even progress reports of benefits obtained.

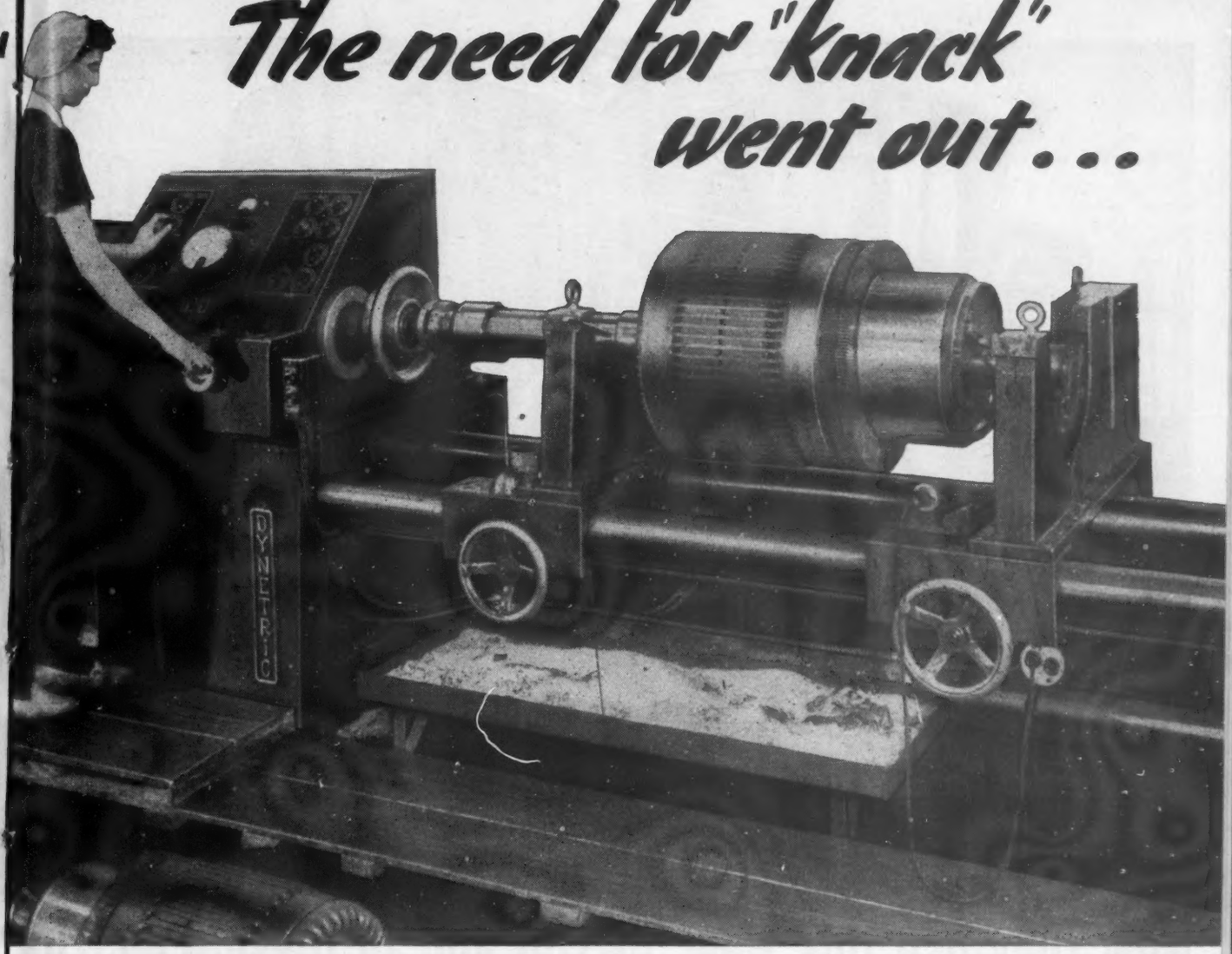
See your Socony-Vacuum representative and *specify* the 4-factor story for your lubrication dollars.

GARGOYLE Lubricants

Call in **SOCONY-VACUUM** *for Correct Lubrication*

SOCONY-VACUUM OIL COMPANY, INC., Standard Oil of N. Y. Division • White Star Division • Lubrite Division • Chicago Division
White Eagle Division • Wadhams Division • Magnolia Petroleum Company • General Petroleum Corporation of California

The need for "knack" went out...



When DYNETRIC BALANCING* came in!

Yes, the old "tricks of the trade" are out of date where static and dynamic balancing is done. Today, with the Gisholt Dynetrics, the *machine knows all the tricks!* Now, even inexperienced personnel can balance rotating parts more quickly, more accurately than the best specialist could ever have done it by any other means.

GISHOLT DYNETRIC BALANCING MACHINES* take advantage of modern electronics to eliminate unbalance. As swift as they are accurate, these machines not only *locate* the source of unbalance but *measure* it as well. The operation is reduced to a simple dial reading. The required corrections are clearly indicated.

**A development of Westinghouse Research Laboratories.*

Gisholt Dynetric Balancing Machines are available in various sizes and types to accommodate any rotating assembly from ½ ounce up to 50 tons. They have put balancing on a low cost and a mass production basis. Any product which uses rotating parts needs this protection against destructive vibration. Literature on request.

GISHOLT MACHINE COMPANY
1217 E. Washington Avenue • Madison 3, Wisconsin

Look Ahead
Keep Ahead
With Gisholt

GISHOLT

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES • SPECIAL MACHINES

For 35 Years the Frick Company used the Same Vulcan Steam Locomotive to Switch Railroad Cars. Now they use this New 50-Ton Vulcan Diesel-Electric

WHEN the Frick Company—world-famous manufacturers of refrigerating and air-conditioning equipment—recently decided to purchase a new Diesel-Electric Switcher, it was natural that they should turn again to the same organization that had served them so well more than a third of a century ago. And we welcomed the opportunity to give them our best possible service again—because that's how Vulcan has steadily grown larger and stronger; for nearly a hundred years.

The locomotive here illustrated and described is especially suitable for the Frick Company's requirements but we build all types and sizes from 6 to 100 tons; Steam, Electric, Gasoline, Diesel and Diesel-Electric—wide or narrow gauge. More than 5,000 Vulcan Locomotives have gone into service since "Old No. 1" was built in 1874, and our list of users is practically a "Blue Book" of leading mining and industrial organizations throughout the United States and many other countries.

Deliveries are still subject to approval of the War Production Board but inquiries are cordially invited and our experienced engineering executives welcome all opportunities to cooperate in either the selection of standard-type locomotives or in the development of any necessary special features.

WORKING DATA

for 50-ton locomotive illustrated above

PERFORMANCE

Tractive Effort, starting, lbs. (30% adhesion, with sand)	30,000
Tractive Effort, continuous, lbs.	10,800
Speed at continuous T.E., M.P.H.	7.5
Maximum Safe Speed, M.P.H.	20.5

ELECTRICAL EQUIPMENT

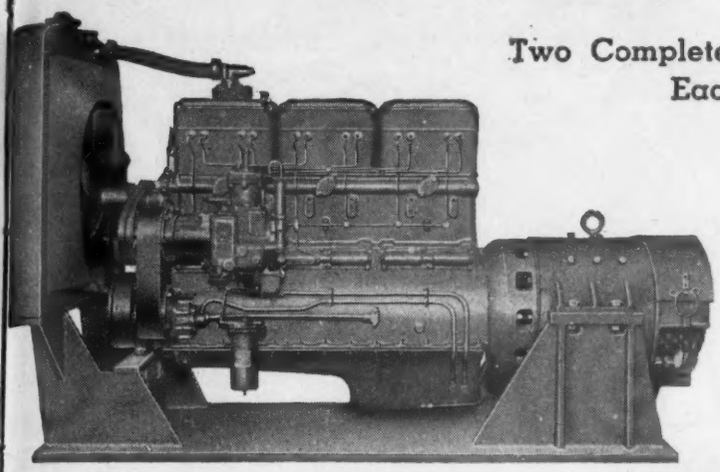
Generators, Two, Westinghouse Type 189-R7, 300 Volts, D. C.
Motors, Two, Westinghouse Type 1443-A, 300 Volts, D. C.
Motor Gear Ratio, 21.4 to 1.
Control, Westinghouse Single-Station Electro-Magnetic.

MECHANICAL EQUIPMENT

Engines, Two, Full Diesel, rated 150 hp. at 1800 R.P.M.
Brakes, Westinghouse Straight and Automatic, Schedule 14-EL.
Compressors, Two, each 34 C.F.M., mechanically driven.

DIMENSIONS

Track Gauge	4'-8½"
Truck Wheel-Base	5'-0"
Length, over bumpers	27'-8"
Width, over all	9'-5"
Height, over all	11'-6"
Wheel Diameter	33"



Two Complete Diesel-Electric Power Units, Each Mounted on a Heavy Steel Sub-Base

Each of the two power units comprises a 6-cylinder full Diesel Engine, rated 150 hp. at 1800 R.P.M., direct connected to a Westinghouse D.C. Generator. By mounting each complete unit on a powerful steel sub-base, as here illustrated, all parts are made readily accessible for cleaning, inspection and minor repairs. When a major overhaul eventually becomes necessary the entire assembly can easily be lifted out and replaced.

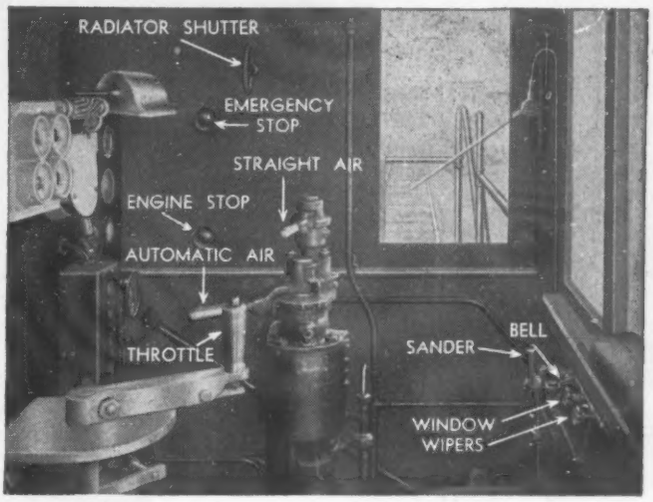
The main generators are equipped with starting windings for cranking the Diesel engines; power for which is supplied by a lead-acid-type storage battery of ample capacity. Small auxiliary generators—one on each engine—keep the storage batteries fully charged and supply adequate power for lights, controls, etc.

Convenient One-Man Control with Good Visibility in All Directions

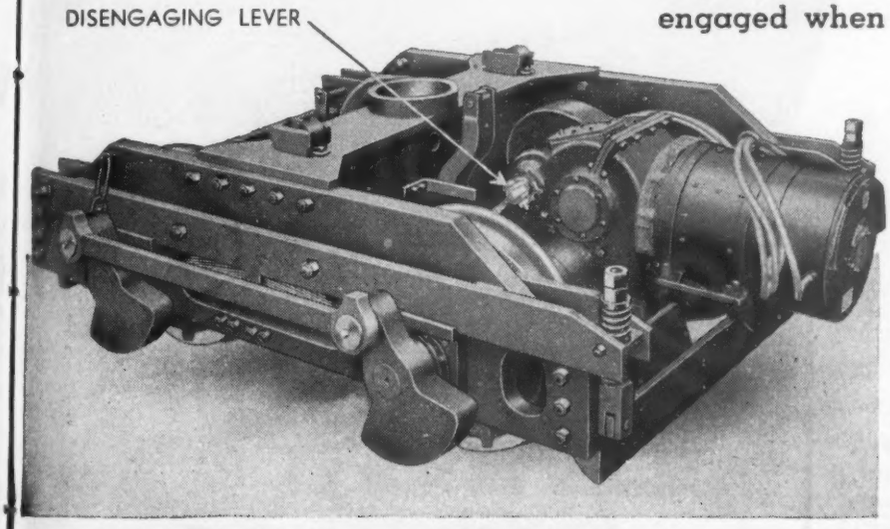
The roomy cab has large windows on all four sides, giving good visibility in all directions, and the Westinghouse Single-Station Electro-Magnetic Control makes operation extremely simple; the engineer using only a throttle and reversing lever to control speed and direction of motion. The Westinghouse Straight and Automatic Air Brakes are equally easy to apply and can always be relied upon for a quick smooth stop when necessary.

As shown in the accompanying illustration, the throttle and the two brake levers are all grouped closely together and so located that the engineer can reach any of them conveniently with one hand, whether running the locomotive forward or backward.

Window Wipers are of unusually sturdy construction and are operated by compressed air from the main reservoir as are also the Sanders and Bell. Control valves are located for convenient operation by the engineer whether running forward or backward.



Triple-Reduction Gears Easily and Quickly Disengaged when "Free-Wheeling" is Necessary



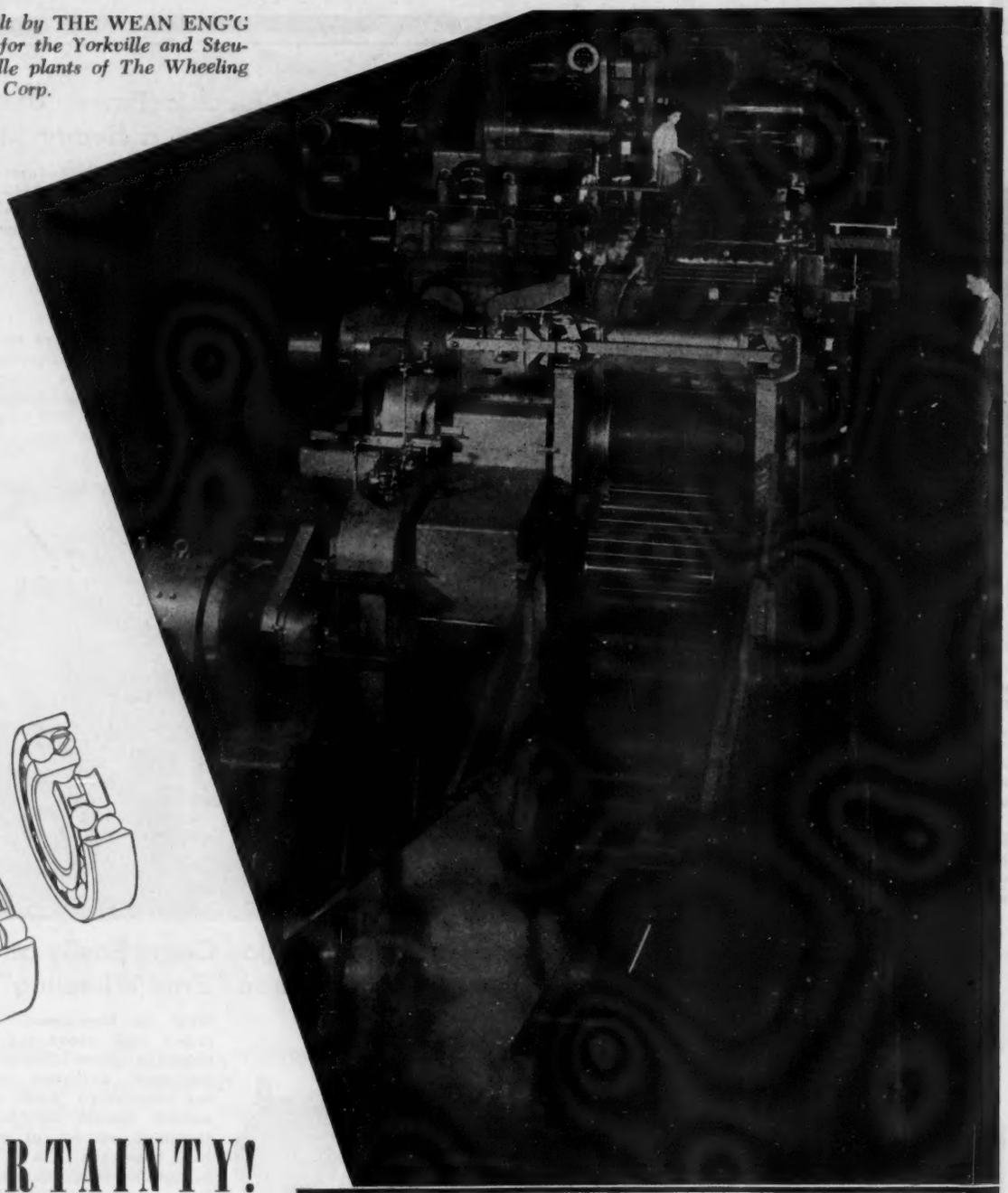
With its high-speed, high-efficiency motor raised well above the track and its triple-reduction gears fully enclosed in an oil-tight, dust-proof, cast-steel housing, this compact four-wheel-drive truck embodies every approved feature for heavy-duty yard and switching service at moderate speeds. Its high gear ratio (21.4 to 1) gives ample power to slip the wheels under excessive load; thereby preventing stalling of the motor.

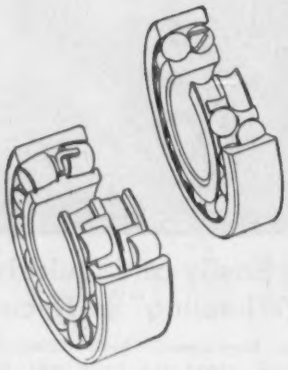
An exclusive Vulcan feature is the readily accessible "Disengaging Lever" which, when rotated through 180°, disengages the reduction gearing; thereby permitting the locomotive to be towed at high speeds without injury to the gears, bearing or armature windings.

Positive four-wheel drive on each of the two trucks is attained by the use of forged-steel solid-end side rods which are accurately counter-balanced and set 90 degrees apart.

VULCAN IRON WORKS
WILKES-BARRE, PENNA., U.S.A.
New York Office 50 Church St.

• *Built by* THE WEAN ENG'G CO., *for the Yorkville and Steubenville plants of The Wheeling Steel Corp.*





FOR CERTAINTY!

That moving parts on this Electrolytic Tinning Machine may turn freely, more efficiently, more certainly. That waste in labor and machine tieups resulting from bearing trouble may be curtailed. That production may be increased. These are the reasons why at least 80% of the bearings throughout this machine are SKF's. Every tick of the clock, year in and year out, finds SKF Bearings giving carefree performance, requiring only occasional lubrication, and never needing adjustment. No matter how *small* or BIG the job, SKF puts the right bearing in the right place.

5799

SKF INDUSTRIES, INC., PHILA. 34, PA.

SPECIFY

SKF

BEARINGS

the new—

Hanna *hydraulic* Cylinder *Calculator*

Calculator for Hanna Hydraulic Cylinders
HANNA ENGINEERING WORKS
1765 ELSTON AVE. CHICAGO 22, ILL.
HYDRAULIC AND PNEUMATIC EQUIPMENT

What the Hanna Calculator will do—

WHEN YOU HAVE:	YOU CAN FIND:
Required force and line pressure	• *Effective area*
Required force and effective area	• *Line pressure*
Effective area and line pressure	• *Force*
Effective area and cylinder stroke	• *Cylinder displacement*
Cylinder displacement and cylinder stroke	• *Effective area*
Effective area and cylinder displacement	• *Cylinder stroke*
Cylinder displacement and time	• *Pump delivery*
Pump delivery and time	• *Cylinder displacement*
Cylinder displacement and pump delivery	• *Time*
Pump delivery and pipe velocity	• *Pipe size*
Pump delivery and pipe size	• *Pipe velocity*
Pipe size and pipe velocity	• *Pump delivery*
Effective area and pump delivery	• *Stroke velocity*
Pump delivery and stroke velocity	• *Effective area*
Effective area and stroke velocity	• *Pump delivery*
Pump delivery—Pump efficiency and pressure	• *Horse power*
Pump delivery Pump efficiency and horse power	• *Pressure*
Pressure—Horse power and pump efficiency	• *Pump delivery*
Pressure—Horse power and pump delivery	• *Pump efficiency*

A time-Saver . . .

for accurate answers . . . quickly computes size pressure, speed of cylinders . . . size of pump, valves, pipe and motor

What cylinder force and velocity is needed? How much must the pump deliver? What h.p. should the motor be? Size of pipe and valves?

These are some of the problems you can work quickly and accurately with the Hanna Calculator Designed for busy engineers who are using more and more smooth hydraulic cylinder power, this new tool eliminates the need for multiple tables, graphs, chartsand data. Nineteen distinct operations may be performed on the calculator (see panel at left)—required values are found through rapid calculations based upon other values on the same scale.

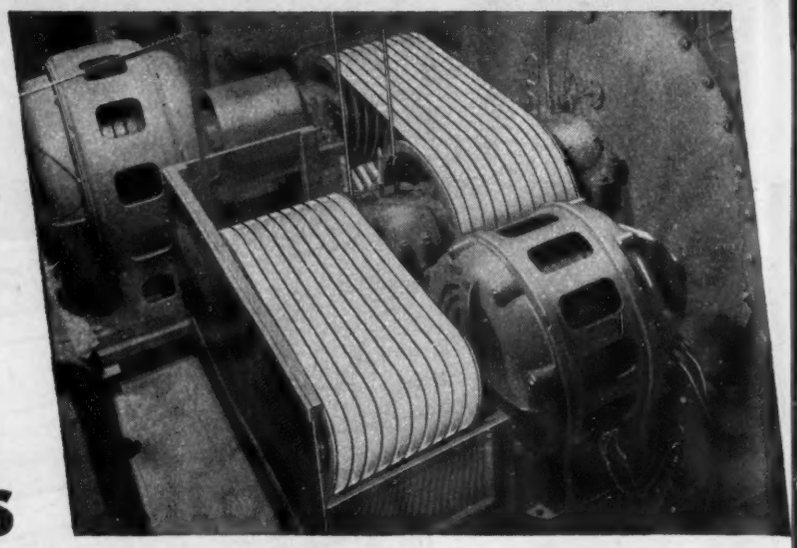
Wherever you plan to use the advantages of Hanna Hydraulic Cylinders for dependable push or pull power, you'll want the Hanna Calculator to swiftly determine the exact specifications of all components. Hanna engineers developed the calculator for you—you may have it with their compliments and without obligation. Just write us giving your name, title, company and address.

Hanna Engineering Works

hydraulic and pneumatic equipment . . . cylinders . . . valves . . . riveters

1769 Elston Avenue, Chicago 22, Illinois

Today-



Your *Standard*

GATES V-Belts

—Made of *Synthetic* Rubber—

are out-performing *ANY* V-Belts ever made of *NATURAL* Rubber!

No V-Belts built by *anyone* before the war could stand the service now daily delivered by Gates V-Belts on army tanks, tractors and self-propelled big guns. Gates developed these greatly superior V-Belts through intensified, specialized research—and Gates is building these belts entirely of *synthetic rubber.*

This fact is now important to YOU —— and here is the reason:

● **Every improvement developed by Gates for these Army V-Belts has been added, day by day, to the quality of the standard Gates Vulco Ropes which have been delivered to you.**

In the case of many *other* products, as you know, you must wait until after the war to get the benefits of war-time improvements. But victory depends so directly upon production and production so directly upon V-Belts which drive the producing machines, that Gates has been able to give you *immediately,* in your Standard Gates Vulco Ropes, every V-Belt improvement which Gates specialized research has developed for use in the Army's motorized equipment.

In addition, where V-Belts of special construction are required, your Gates Rubber Engineer is in position to supply a Gates V-Belt that is precisely engineered to meet your special needs.

Whatever drive problem or V-Belt problem you may have, you need only to pick up your phone book and look under the heading "Gates Rubber." The Gate Rubber Engineer will bring right into your plant the full benefits of every advance in V-Belt construction and in drive operation that Gates specialized research has developed.

NOTE: GATES ALSO MAKES THESE SPECIAL BELTS TO MEET EXCEPTIONAL SERVICE NEEDS-

Rayon Cord V-Belts
Static-Safety V-Belts
***Special* Synthetic** V-Belts
Cotton Cord V-Belts
Steel Cable V-Belts

THE GATES RUBBER COMPANY

Engineering Offices and Jobber Stocks in All Large Industrial Centers

Gates
The Mark of Specialized Research

456

GATES VULCO ROPE DRIVES

CHICAGO 6, ILL. 549 West Washington. NEW YORK CITY 3, 215-219 Fourth Avenue ATLANTA 3, GA., 738 C. & S. National Bank Bldg.
LOS ANGELES 21, CAL., 2240 E. Washington Blvd. DENVER 17, COLO., 999 S. Broadway DETROIT 4, MICH., 8663 Grand River Ave.
PORTLAND 9, ORE., 333 N.W. 5th Ave. DALLAS 2, TEXAS, 1710 N. Market St. SAN FRANCISCO 3, CAL. 1090 Bryant St.

IT'S A WAY TO TOKYO
STILL A LONG WAY TO TOKYO

Iwo Jima was tough. Okinawa was tough. Those places are the pattern of resistance we may expect from now on in this war. *And it may be far worse.* In any event, it's going to take a lot more money to win final Victory. Here are a few reasons why:

- ★ We must outfit and move millions of fighting men from Europe.
- ★ We must supply these forces with thousands of tanks, planes, jeeps, guns and shells.
- ★ We must build ships to keep huge quantities of this vital material constantly flowing across the vast reaches of the Pacific.

Your help is needed to do this job. Do your part . . .

BUY MORE BONDS

7th War Loan

THE STANDARD TUBE CO.

Detroit 3, Michigan

Welded Tubing — Steel Forgings

MORE than five times the size of an ordinary fire brick, yet it weighs practically the same! That in a few words tells the story behind the installation economies of J-M Insulating Fireblok.

Lightness speeds work—You can see immediately what the light weight of these large-size units means in terms of labor economy . . . speedier installation.

Easily cut and fitted—J-M Insulating Fireblok can be cut with a saw, shaped with a rasp, or drilled . . . and easily fitted into irregular positions. Makes a large stock of special shapes unnecessary.

Minimum of joints—The large size of J-M Insulating Fireblok so reduces the number of joints as to materially improve the thermal efficiency of the construction.

Economical bonding — Naturally, this reduction in joint length speeds work and reduces the amount of cement needed for bonding. (J-M 1626 cement was developed especially for this use.)

Uses—Use Fireblok w here Insulating Fire Brick is recommended—industrial furnaces, flues, etc. It is particularly suitable for door linings, suspended arches, and when tapered, for sprung arches of exceptional stability.

For specific temperature ranges—These block-shaped, workable insulating refractory linings come in 4 different types—the same as J-M Insulating Fire Brick. Each type was especially developed for its particular temperature range.

Fireblok is only one of many J-M Insulations for industrial use. Johns-Manville Insulations cover the full temperature range from 400° F below zero to 2600° F above. J-M's long experience and research assure you authoritative help in your insulation planning. For further information, write Johns-Manville, 22 E. 40th St., New York 16, N. Y.

Over 5 times as large as ordinary fire brick, Fireblok goes into place quickly and economically. Not only is labor time saved, but costly shut-down time is decreased.

4 Fireblok types available

JM-1620 Fireblok for exposed temp. to 1600° F. As back-up to 2000° F.

JM-20 Fireblok for use up to 2000° F. Exposed or back-up.

JM-23 Fireblok for use up to 2300° F. Exposed or back-up.

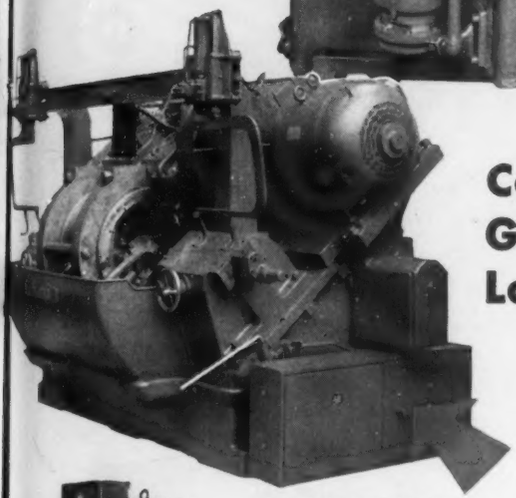
JM-26 Fireblok for use up to 2600° F. Exposed or back-up.

JOHNS-MANVILLE *First in* INSULATIONS

SPECIAL PANELS

SNYDER TOOL & ENGINEERING CO., Detroit, Mich. A-B special panel is convenient for installation and inspection.

LEMAIRE TOOL & MFG. CO., Dearborn, Mich. Vertical milling machine with A-B special panel. Note the handy location of safety disconnect switch.

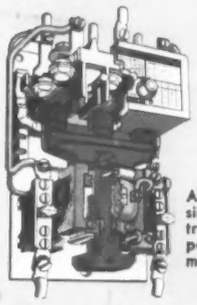


Correct Sequence Control
Greater Safety for Operators
Lower Maintenance Costs

The advantages of automatic electric control cannot be fully realized unless relays, starters, timers, etc., are mounted on a special control panel...engineered to fit a particular machine. Wiring errors are virtually eliminated, correct sequence operation is assured, and installation costs are reduced. With centralized control, inspection is easy.

Follow the example of leading machinery builders and submit your machine tool control problems to Allen-Bradley engineers.

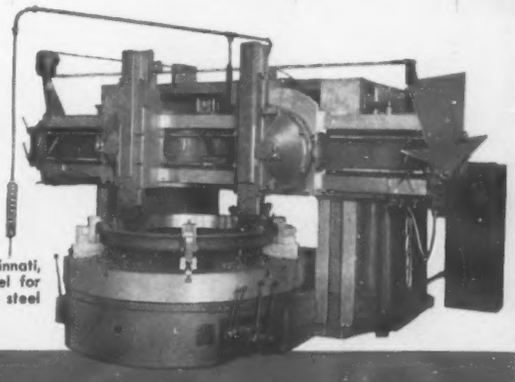
Allen-Bradley Company
1316 S. Second St., Milwaukee 4, Wis.



The keystone of all A-B special panels is the simple A-B Solenoid Control. Only one moving part. There is no contact maintenance.

R. K. LEBLOND MACHINE TOOL COMPANY, Cincinnati, Ohio. A-B special panel on base of crankshaft lathe.

LODGE & SHIPLEY MACHINE TOOL CO., Cincinnati, Ohio. No. 3 Duomatic Lathe with A-B panel.



CINCINNATI PLANER CO., Cincinnati, Ohio. A-B special control panel for boring mill is in self-supporting steel cabinet.

ALLEN-BRADLEY

CONTROL PANELS FOR MACHINE TOOLS

QUALITY

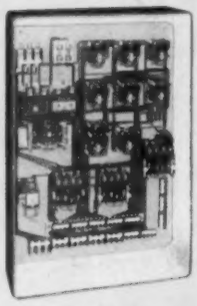
THE ALLEN-BRADLEY LINE OF SOLENOID STARTERS

SIMPLE DESIGN • SILVER ALLOY CONTACTS • TROUBLE-FREE OPERATION

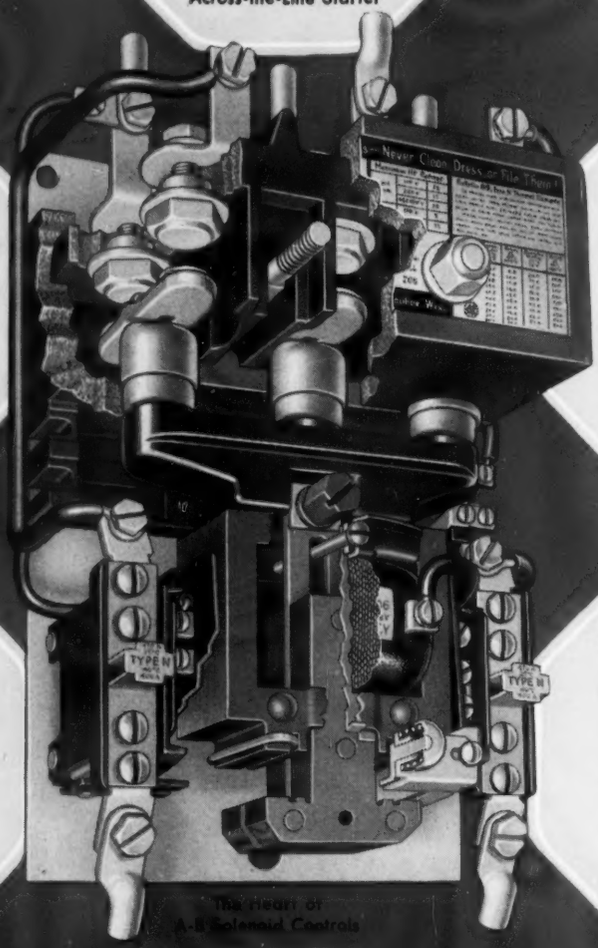
Bulletin 702
Solenoid Contactor

Bulletin 709
Across-the-Line Starter

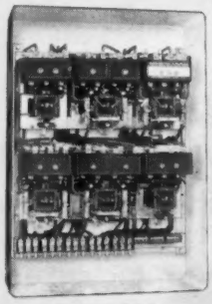
Bulletin 705
Reversing Switch



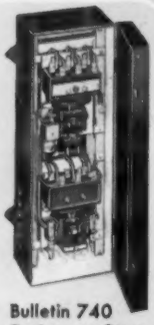
Special Panels
for Machine Tools



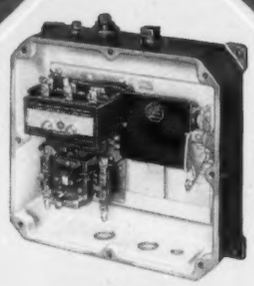
The Heart of
A-B Solenoid Controls



Bulletin 715
Multi-Speed Starter



Bulletin 740
Auto. Resistance Starter
Velvet-Smooth Acceleration



Bulletin 712
Combination Starter
in Watertight Enclosure

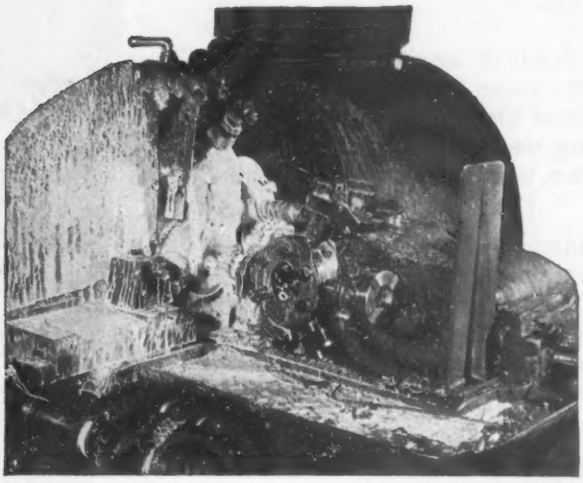
The design of Allen-Bradley controls follows a uniform pattern throughout the entire line. The basic unit is the standard A-B solenoid switch, available in six sizes and a maximum rating of 150 amperes. All have only one moving part. All have silver alloy contacts. There is no contact maintenance. Such standardization and simplicity guarantee trouble-free performance. That is the experience of all users of Allen-Bradley solenoid motor control.

MOTOR CONTROLS FOR ALL INDUSTRIES

A-B Quality

ALLEN-BRADLEY

QUALITY



Let Your Production Records Prove Our Claim... PERFECTED LUBEWELL CUTTING COMPOUND WILL SHOW A PRODUCTION INCREASE PER MACHINE UP TO 25% REGARDLESS OF THE MACHINING OPERATION OR THE MACHINE TOOL BEING USED.

To prove with your figures, on your work, in your plant, that this statement is founded in fact, G. Whitfield Richards will ship you any quantity of Perfected Lubewell Cutting Compound. You will find that it will 1. Increase machine production up to 25%; 2. Increase tool life up to 50%; 3. Give a superior finish and closer tolerances; 4. Lower cutting lubricant cost as much as 40%. We stand ready to prove this claim without obligation. Perfected Lubewell costs from 3 to 9 cents per gallon in the machine. Write today.

G. WHITFIELD RICHARDS

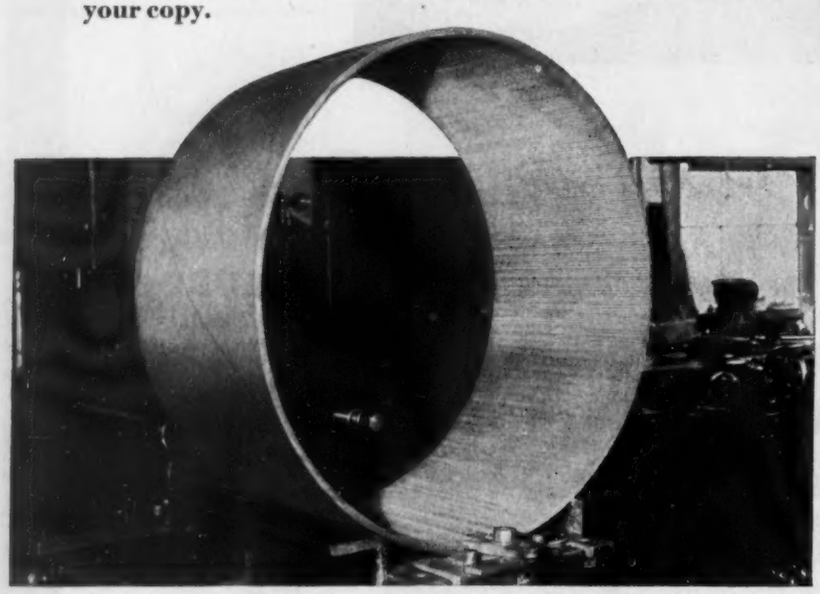
PIONEERS OF *Water Soluble Cutting and Drawing Lubricants*

1738 CARLTON STREET • PHILADELPHIA 3, PA.

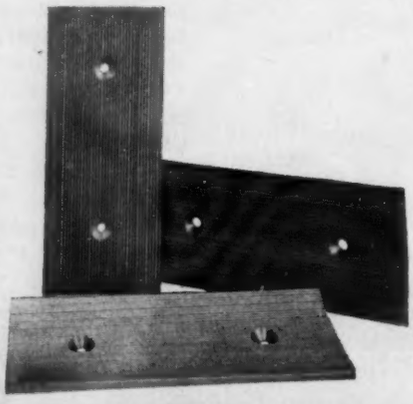
Users Continue Praise for SPEED TREAT and SPEED CASE Plate

New materials and methods of merit take hold fast in America. That's why more and more manufacturers are adopting *Speed Case*, a low carbon, open hearth, free machining steel (X1515) and *Speed Treat*, a medium carbon, open hearth, free machining steel (X1545).

Both offer the advantages of easy cutting with resultant lower tool costs, better finish more readily obtained, fast and uniform response to heat treatment and desirable qualities through heat treatment, such as stress-resistance and surface hardness. Catalog 1243 details numerous case studies — send for your copy.



The F. H. Ayer Mfg. Co., Chicago Heights, Ill., cut machining costs 52%, in addition to lowering tool costs and reducing material costs, by using *Speed Treat for hammermill plates*. A *Speed Treat* plate 8' x 18" x 1⅛" was rolled into a cylinder, welded and machined. Inner corrugations were machined in 22 hours. Outside was machined in 40 hours. Cylinder was then cut into plates, as shown at right, which were drilled and counterbored. In heat treating, plates were quenched in water from 1575° F. and drawn at 500° F.; a hardness of 45 on the Rockwell "C" scale resulting. This is a typical user report of saving with *Speed Case* and *Speed Treat* plate.



Now Available At These 12 Dependable Sources:

The Burger Iron Co.
AKRON, OHIO

Brown-Wales Co.
493 C St.
BOSTON, MASS.

Beals, McCarthy & Rogers, Inc.
BUFFALO, N. Y.

Peninsular Steel Co.
1030-40 McDougall Ave.
DETROIT, MICH.

W. J. Holliday & Company
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Earle M. Jorgenson Co.
5311 Clinton Drive
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W. J. Holliday & Company
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Grammer,
Dempsey & Hudson, Inc.
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Earle M. Jorgenson Co.
1657 22nd St.
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Horace T. Potts Co.
East Erie Ave. and "D" St.
PHILADELPHIA, PA.

Peckover's Limited
77 Front St. E.
TORONTO, ONT., CANADA

W. J. HOLLIDAY & CO.

89 Years of Progress

Speed Case—Speed Treat Plate Division
HAMMOND, INDIANA

Established 1856

BETTS-BRIDGEFORD LATHES

BETTS-BRIDGEFORD LATHES

For Speed, Accuracy and Economy

BETTS-BRIDGEFORD
96″ COMBINATION
BORING AND TURNING LATHE

This Betts-Bridgeford Lathe will swing work 100 inches in diameter over the bed. It takes 70 feet between centers, and will bore up to 25 feet in length. ACCURATE . . . POWERFUL . . . FAST.

Betts-Bridgeford Lathes are built from 26″ up to any requirement

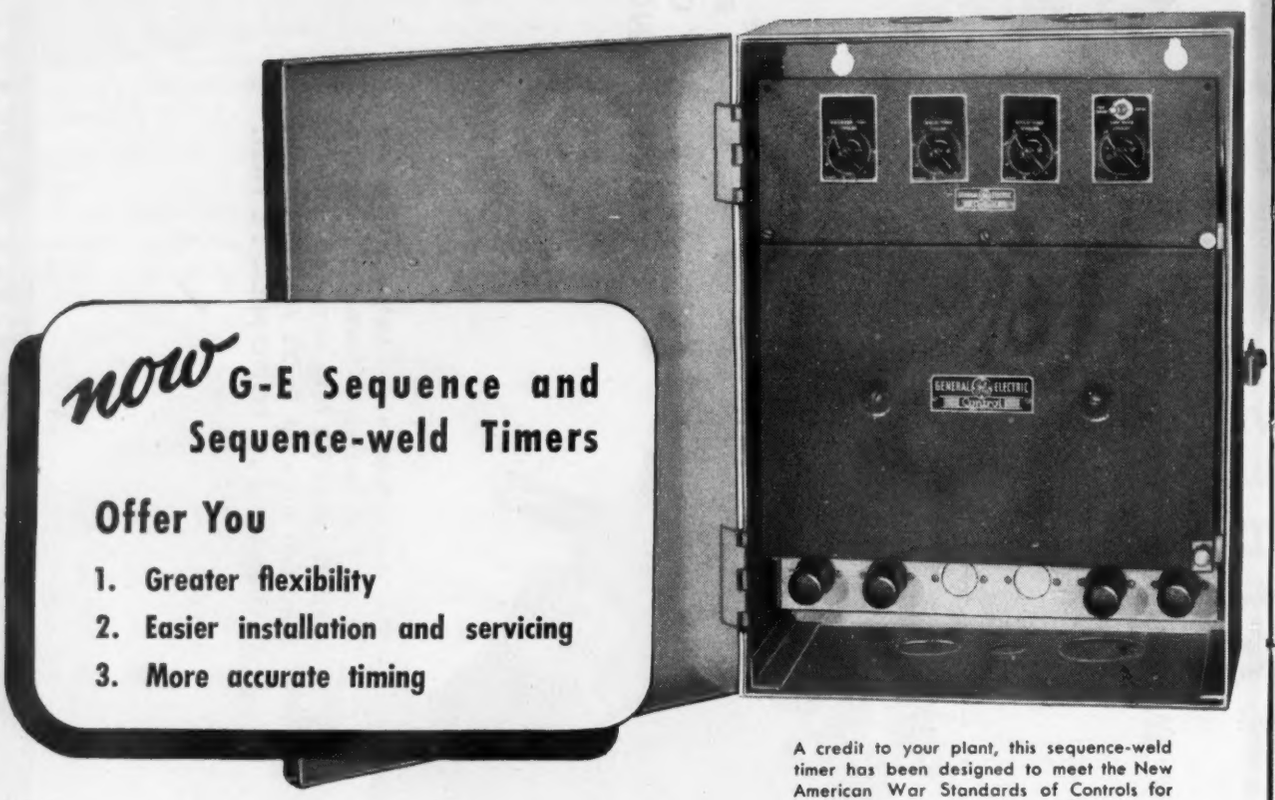
CONSOLIDATED HEAVY DUTY MACHINE TOOLS INCLUDE....
LATHES
BORING MILLS
DRILL PRESSES
MILLING MACHINES
BORING MACHINES
PLANERS
SLOTTERS
SPECIAL MACHINES
RAILROAD SHOP TOOLS

BETTS • BETTS-BRIDGEFORD • NEWTON • COLBURN • HILLES & JONES • MODERN

CONSOLIDATED MACHINE TOOL CORPORATION • ROCHESTER 10, NEW YORK

Announcing

AN IMPROVED LINE OF TIMERS FOR RESISTANCE-WELDING MACHINES



now **G-E Sequence and Sequence-weld Timers**

Offer You

1. **Greater flexibility**
2. **Easier installation and servicing**
3. **More accurate timing**

A credit to your plant, this sequence-weld timer has been designed to meet the New American War Standards of Controls for Resistance Welding Machines (C52.4).

IF YOU are using Air-operated welders, you will be interested in this completely redesigned line of sequence and sequence-weld timers which provide consistent and automatic timing of the complete welding cycle. It includes controls for all standard combinations in which ignitron contactors or synchronous-precision timers are used.

You can change welding sequence easily—Each control is constructed in such a way that the timing control section can be removed in less than a minute—and placed in another machine. This feature is particularly desirable for assembly-line welding because a single spare unit can be used to replace any one of a number of similar timing control sections. And, consequently, servicing will not hold up production.

Also, when production-line requirements change, timing control sections of different types can be interchanged quickly without rewiring.

Because the timing control section can be removed easily (making readily accessible the terminal boards and mounting holes), installation of the complete timer is greatly simplified.

A new and more accurate timing circuit provides consistent welding speed as required for high production welding with short timing intervals, despite nominal variations in line voltage.

Long tube life—The new G-E metal thyratron tube, installed in the timing circuit, will keep this control operating precisely for a long time.

Remote operation—For the convenience of the operator in making adjustments, the timing-control station can be removed easily and mounted on the welding machine or elsewhere.

Built for Your Serviceman

These redesigned controls have many additional features which simplify routine inspection and servicing. Standard industrial-type relays, with which your electrician is familiar and which are easy to service, have been used throughout. Also, by redesigning the wiring system and mounting most of the small resistors and capacitors on a terminal board, servicing has been greatly facilitated.

Need More Information?

Your local G-E office will be glad to tell you more about the jobs that these controls can do—and are doing. Or write directly to us for more information. *General Electric Co., Schenectady 5, N. Y.*

GENERAL ELECTRIC

RESISTANCE-WELDING CONTROL

Buy all the Bonds you can—and keep all you buy

over 500% increase in TAP LIFE

by Sub-Zero Treating in a *Deepfreeze* Industrial Chilling Machine

Sub-zero Treating Increased Production from 2,000 to 12,000 Tapped Holes per Sharpening and Greatly Reduced Machine Down-Time

Here is an example of how Cold Treating increased the productivity and efficiency of *one type* of metal cutting tool. This large Midwestern manufacturer taps 6 holes in cast-iron automotive brake cylinder blocks with a 5/16" tap.

Prior to Cold Treating, production averaged was 2,000 holes per tap sharpening. This required changing taps after the completion of approximately 300 blocks, resulting in excessive machine down-time. Some method had to be found to increase tap life and lessen it.

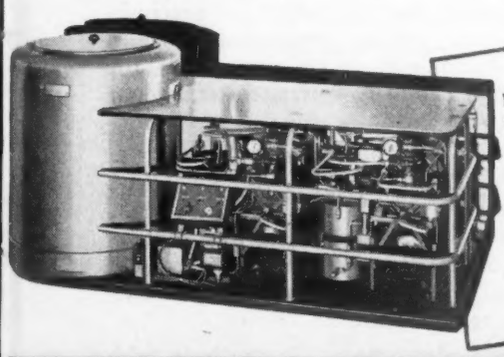
Cold Treating in a Deepfreeze Industrial Chilling Machine solved the problem. By subjecting these taps to sub-zero temperatures of −120° F., tap life was increased from 2,000 to 12,000 holes per tap sharpening—a total productive increase of over 500%. This increase greatly minimized machine down-time. Instead of changing taps every 300 blocks, now from 1,500 to 1,800 blocks are tapped before a change is required.

How Cold Treating Increases Performance Life of Tools

Rapid wear of the conventionally heat-treated taps indicated sub-zero treatment as a possible remedy. Sub-zero treatment at −120° F. gave a structure possessing an improved combination of hardness and toughness, resulting in increased cutting efficiency and lengthened tool life.

Cold Treating Has Numerous Applications

Cold Treating is not restricted to cutting tools. It is also applied with outstanding results to other types of tools and parts where increased hardness and uniformity of structure are demanded for maximum efficiency. It provides the only practical solution of stabilizing gauges and precision parts where a high degree of stabilization is required. It reduces costs and increases production on shrink-fit assembly. It is being widely used for testing materials and numerous miscellaneous applications.



JOB FACTS

Part—Cast-iron Cylinder Brake Block.
Operation—Tap 6 holes.
Machine—Huskins Tapping Machine.
Tool—5/16" Wood and Spencer Tap.
Tap Life Before Cold Treating—2,000 holes per sharpening.
Cold Treating Medium—Deepfreeze −120° F. Industrial Chilling Machine.
Tap Life After Cold Treating—12,000 to 15,000 per sharpening.
Remarks—From 10,000 to 13,000 more holes tapped per sharpening; machine down-time greatly reduced.

FREE...*Here's Cold Treating Information You Need*

To completely understand the underlying principles of cold treating and to determine how and to what extent it can be applied to your production, write for this valuable 40-page bulletin. It gives you concise, factual data on Cold Treating from its inception to the present time. Complete with tested procedures, field test reports and specifications of Deepfreeze Industrial Chilling Machines—this book merits a place in your technical data file. Write today for your free copy of Bulletin I-4.

Only Motor Products can make a "DEEPFREEZE"

Deepfreeze

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NORTH CHICAGO, ILLINOIS

MOTOR PRODUCTS CORPORATION

"ONE multi-process automatic... and we can scrap FOUR slow....."

Standard machine tools, made in America by the world's leading industry of its type, are winning the wars. They are the envy of our enemies . . . the backbone of our future.

But there are products . . . many of them . . . which require specially designed high speed automatic machinery to put them economically within the reach of all. This is a peacetime problem soon to confront industry.

It is also a problem which many "name" companies are now entrusting to Atlas for solution. We have the personnel . . . 300 or more specialists . . . Engineers, Designers and Toolmakers, whose varied experience is pooled for the creating of products, tools, dies, jigs, special machinery and even complete production lines. A complete plant, equipped with the last word in precision machines and testing equipment, enables them to build and prove the means for making your products better, faster and at lower costs.

Atlas service is all-inclusive or partial, as your needs dictate. We work in cooperation with your staff or "on our own" . . . for large or small programs, an intricate multi-purpose machine or a single part . . . electronics, plastics, fine instruments, transportation, refrigeration . . .

If you are understaffed . . . too busy with war work . . . or need specialized aid . . . call Atlas for a consultation. Brochure on request.

ATLAS TOOL & DESIGNING COMPANY
ATLAS METAL STAMPING COMPANY
Castor & Kensington Avenues, Philadelphia 24, Pa.

● When locomotive parts like that above, or any machine parts with bearing surfaces, slide back and forth, or turn 'round and 'round, there's bound to be abrasion. And abrasion means wear, unless the parts that slide and turn are hard enough to resist abrasion.

When it comes to hardenability, no other material can equal alloy steels. That's why so many vital operating parts in all kinds of equipment are made of these finest of steels.

Alloy steels can be surface hardened or deep hardened to predetermined degrees of hardness with greater assurance of results than any other material. Their uniform response to hardening insures against non-hardened areas or soft spots in wearing surfaces.

But that's only one advantage of using alloy steels. Their high strength-to-weight ratio permits the use with safety of lighter equipment and smaller sections. Their super-toughness provides protection against severe shocks, reversal of stresses or sudden overloading. Their resistance to fatigue, heat, cold and corrosion means long life and lower costs for equipment in which they are used.

Would you like to know what alloy steels can do for you? Republic—world's leader in this branch of steel making—is ready to tell you whenever you're ready to listen.

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

Republic
ALLOY STEELS

Also Carbon and Stainless Steels—Sheets—Plates—Pipe—Upson Bolts, Nuts and Rivers—Electrunite Boiler Tubes

First FOR EXTERNAL THREADING . . .

PLAN-O-MILL with *Exclusive* Offset Head

THREE definite advantages are yours when you use Plan-O-Mill's exclusive Offset Head for external thread milling.

1. Lower cutter cost.
2. Longer cutter life.
3. Better cutting control.

With Plan-O-Mill's exclusive Offset Head you can use a small, solid, low-cost cutter to mill external threads over 1½" in diameter. Shown above is a typical application.

Plan-O-Mill is a high production machine for internal and external threading and form milling. It is fast, accurate and economical, producing work of exceptional finish. General Electric Thy-mo-trol gives separate and complete control of feed-in and feed-around—enables one operator to handle two or more machines.

For war or postwar production, turn now to Plan-O-Milling. Ask your machinery dealer for details or write direct.

Five Firsts

1. First to install General Electric's remarkable new Thy-mo-trol electric feed control!
2. First planetary to mill external threads with standard multiple thread cutter!
3. First planetary to coordinate feeds and speeds!
4. First to provide absolute control of feed-in!
5. First to offer a practical, low cost carbide thread milling cutter!

THREAD AND FORM PLAN-O-MILL MILLING MACHINES

PLAN-O-MILL CORPORATION

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THREAD AND FORM PLAN-CD MILLING CUTTERS

The right source for STAINLESS

A pioneer stainless distributor, Frasse warehouses stainless steel sheets, bars, pipe, wire and tubing in wide size and type ranges. Augmented stocks—more than doubled to serve war needs—are immediately available for your applications.

Stainless is a major Frasse service, complete with experienced engineering personnel. Frasse steels are prime, first quality, to Army and Navy specs. Convenient government inspection facilities... certifications quickly available.

For Stainless Steel, call, write or wire Frasse first. Your inquiries and orders will receive every attention. *Peter A. Frasse & Co., Inc., 17 Grand Street, New York 13, N. Y. (Walker 5-2200)* *111 Wissahickon Avenue, Philadelphia 29, Pa. (Radcliff 7100—Park 5541)* • *P. O. Box 946, Buffalo 5, N. Y. (Washington 2000)* • *Jersey City* • *Hartford* • *Rochester* • *Syracuse* • *Baltimore*

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BARS

Type 302 Rounds	1/8" to 4"
Type 303 Rounds	1/16" to 6"
Type 416 Rounds	3/32" to 4"
Type 303 Hexagons	5/32" to 2"
Type 416 Hexagons	1/4" to 2"
Type 302 Squares	1/4" to 2"
Type 303 Squares	1/8" to 3/16"
Type 302 Flats	1/8" x 3/8" to 1" x 4"

SHEETS AND PLATES

Type 302
.019" (26 ga.) to .250" (1/4")—24" x 96" to 48" x 120"

STRIP

Type 302 . .010" to .062"—12" to 24" x 120"
Also in spring temper

TUBING

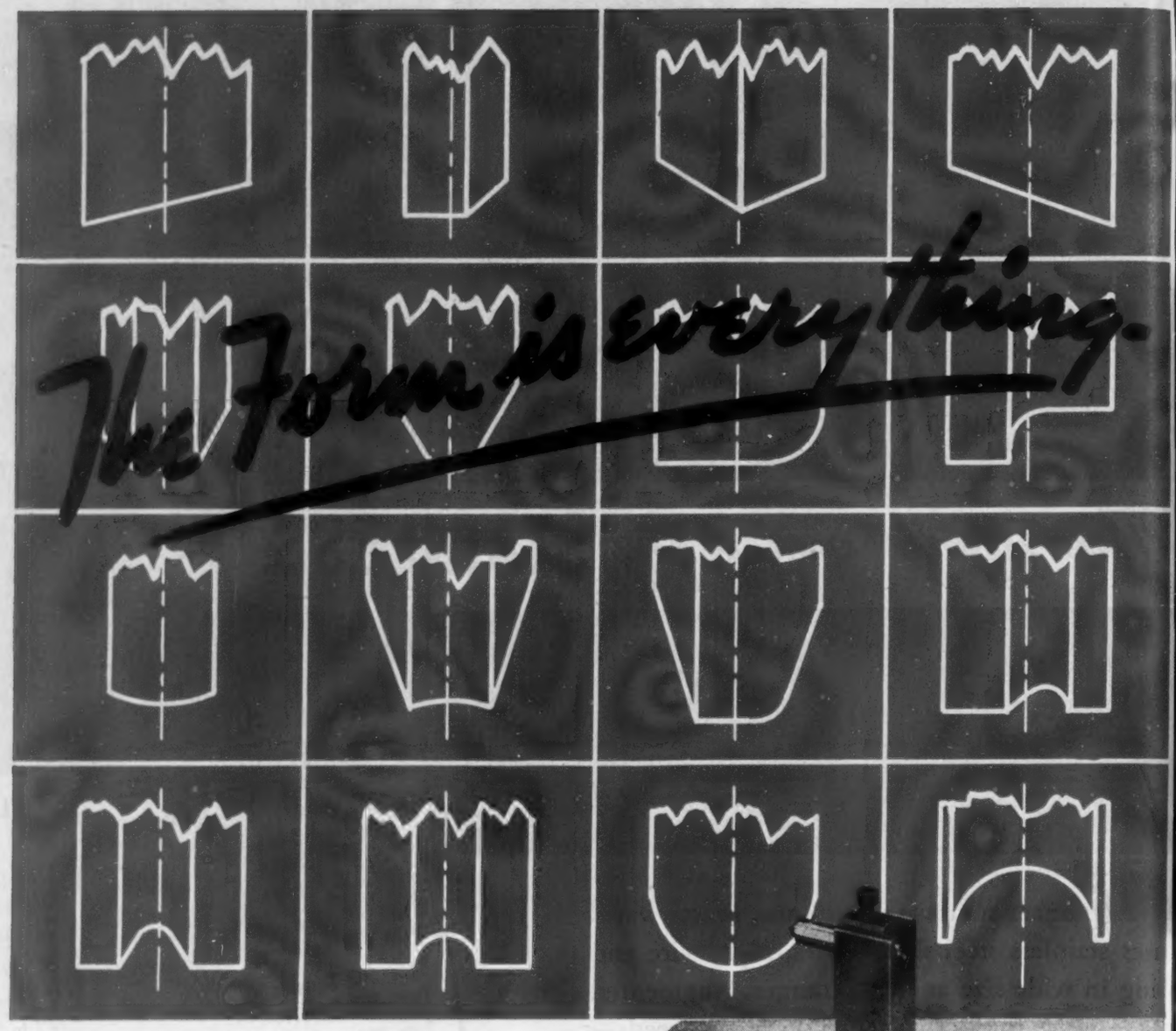
Type 304 Seamless 1/8" to 5" O.D. x 20 ga. to 1/4" wall
Type 304 Welded 3/8" to 1½" O.D. x 18 ga. to 16 ga. wall
Type 347 Welded 3/8" to 3½" O.D. x 20 ga. to 16 ga. wall

PIPE

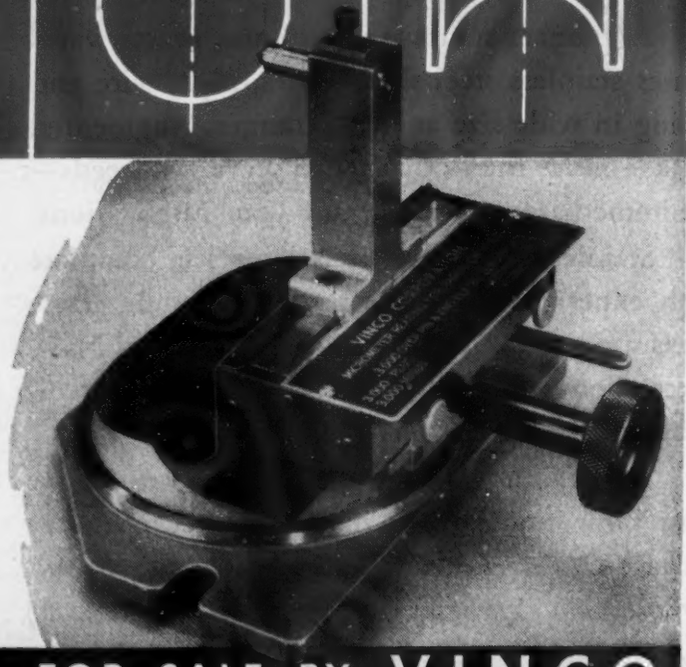
Type 304 Seamless	1/8" SPS to 6" SPS
Type 304 Welded	—1/8" EHPS to 4" EHPS
Type 316 Welded	1/8" SPS to 2" SPS
Type 347 Seamless	1/2" SPS to 2" SPS
	1/2" SPS to 3" SPS

FRASSE MECHANICAL AND AIRCRAFT STEELS

CARBON, ALLOY AND STAINLESS STEEL BARS, TUBES, SHEETS, STRIP AND WIRE



. . . and definitely so when applied to grinding-wheel forms. Dressing and repeating that form within an accuracy of .0001"—simple and rapid conversion to other jobs—eliminating time-wasting adjustments on the diamond post—these are items that can loom large in production costs. Reducing these costs and improving the form dressing is the prime object of the VINCO B-1 DRESSER (angle tangent to radius). Precision built—reliable year-in and year-out, and adaptable to nearly every type of grinder. Write for more detailed information.



MILLIONTHS OF AN INCH FOR SALE BY VINCO

REG. U.S. PAT. OFF.

VINCO CORPORATION, 8875 SCHAEFER HIGHWAY, DETROIT 27, MICHIGAN; SALES OFFICES, NEW YORK, CHICAGO, CLEVELAND

Semi-Automatic Hydraulic Spline and Gear Grinder • Optical Master Inspection Dividing Head • Involute Checker • Angle Tangent to Radius Dresser • Index Plates • Precision Vises • Sine Bars • Straight-side Spline, Serration Spline, Involute Spline and Helical Spline Plug and Ring Gages • Thread Plugs, Rings and Setting Plug Gages • Spur and Helical Master Gears • Munition Gages • Propeller Hub Gages • Built-up and Special Gages • Gear Rolling Fixtures • Spline and Index Fixtures • Hydraulic Power, Control, Utilization and Distribution Units • Engineering, Design and Development.

Design that part in ArmaSteel*

The metal that replaces forgings; cuts machining time up to 60 per cent

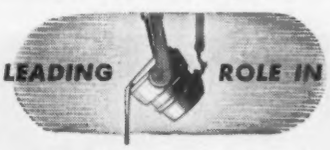
Cast to conform closely to final shapes, ArmaSteel reduces the amount of metal to be removed, eliminating up to 60 per cent of machining time. In addition, ArmaSteel gives 10 to 50 per cent better machinability with a 20 to 100 per cent increase in the number of parts finished per tool grind. Experience in the production of a particular gun part resulted in nearly 15,000 pieces being obtained per tool grind without the use of a coolant.

Gun parts weighing less than a pound, and Diesel locomotive pistons weighing more than 50 pounds, have been cast successfully with ArmaSteel.

To industries awaiting "Go Day" on civilian production we suggest keeping ArmaSteel's war record in mind when setting up production programs. Parts can be made faster, better, cheaper with ArmaSteel castings.

PROPERTIES . . . QUALITIES

- Cast to conform closely to final shapes.
- Excellent machinability.
- Hardenability comparable to 5040-A steel.
- Ready response to selective hardening.
- Good fatigue life.
- Excellent bearing properties (eliminates need for bushings in many applications).
- Polishes to mirror finish.
- Low co-efficient of thermal expansion.
- High strength.
- Versatility.
- Good corrosion-resistance.

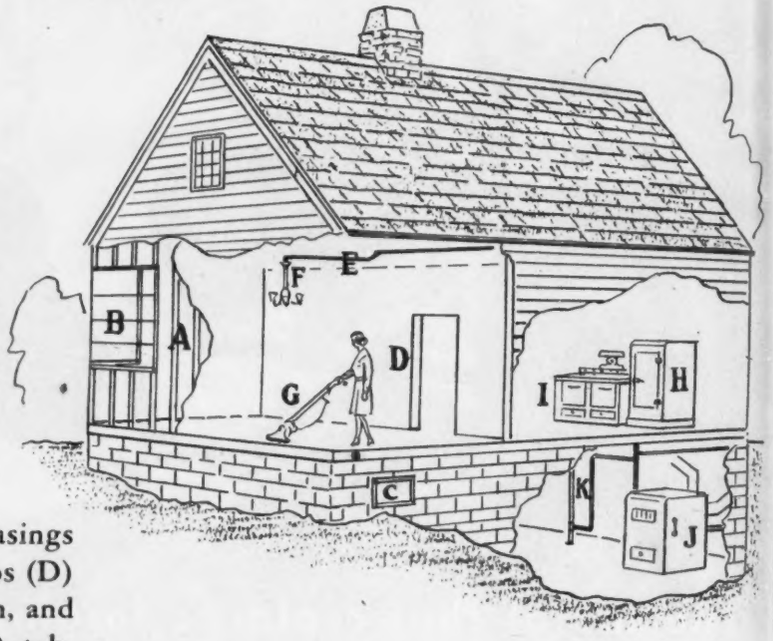
CAST FOR A LEADING  ROLE IN INDUSTRY

First Things First
BUY WAR BONDS

SAGINAW MALLEABLE IRON DIVISION OF GENERAL MOTORS
SAGINAW, MICHIGAN

*Reg. U. S. Pat. Off.

COMPONENTS FOR "HIGH-DEMAND" SPECIALTIES AT LOW-COST ON *Yoder* MACHINES . . .



● **For example, consider the many sections that can be formed on Yoder Cold-Roll-Forming Machines, some of the most common every day uses of which are illustrated in the schematic drawing at right.**

Structural forms, such as angles or channels, suitable to steel frame construction (see "A" in illustration) can be produced in quantity at low cost on a YODER machine . . . The same is true of steel sections for window frames (B) or basement chute casings (C): Steel reinforcing or binding strips (D) for various types of wall construction, and metal conduit for electrical wiring (E), tubing for electrical fixtures (F) or vacuum cleaners (G) can be manufactured in profitable quantities on YODER equipment.

In modern design of refrigerators (H) and stoves (I) and furnaces or air conditioning units (J) framing with low-cost angles or channels opens a big market for such sections. YODER machines produce this type of fabricating material as well as all kinds of mouldings very economically. Tubing and pipe for household plumbing (K) and for industrial use cannot be produced by any better method than on YODER mills. Yoder forming machines also make tubing suitable to the manufacture of modern furniture, bicycles, hospital equipment, as well as special sections for making folding chairs, and folding tables, and many strips and mouldings for radios, electrical control panels, automobiles, etc. Machines for high speed cutting off of formed sections, tubes, rods are also available.

In addition to making all types of high production metal working machinery Yoder offers a complete engineering and designing service, can develop and build complete manufacturing plants. Further information is available to you on request, either in bulletins on special lines or by consultation. Write to

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5502 WALWORTH AVENUE, CLEVELAND 2, OHIO, U. S. A.

METAL • WORKING • PRODUCTION • MACHINERY
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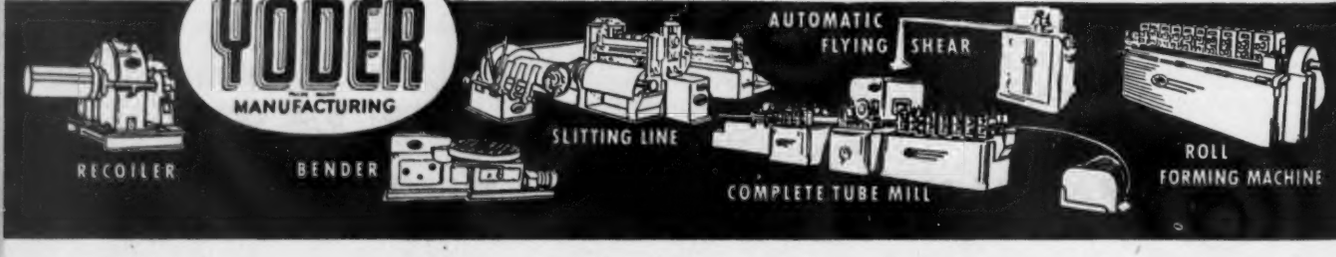

Cleaner Steel With

SIL·X

REGISTERED TRADEMARK
(REG. U.S. PAT. OFF.)

EXOTHERMIC FERROSILICON

Photo of ignited briquet exhibiting exothermicity.

"SIL-X" is widely used by operators of

OPEN HEARTH FURNACES
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STEEL AND IRON FOUNDRIES

Its exothermicity provides molten ferrosilicon at the desired spot, whether in the furnace or ladle. The use of "SIL-X" results in cleaner metal with lower conditioning costs.

Prepared in two grades—"75" and "145". Write for information on the use of "Sil-X", "Chrom-X" and "Riser-X".

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MINING & SMELTING CORPORATION
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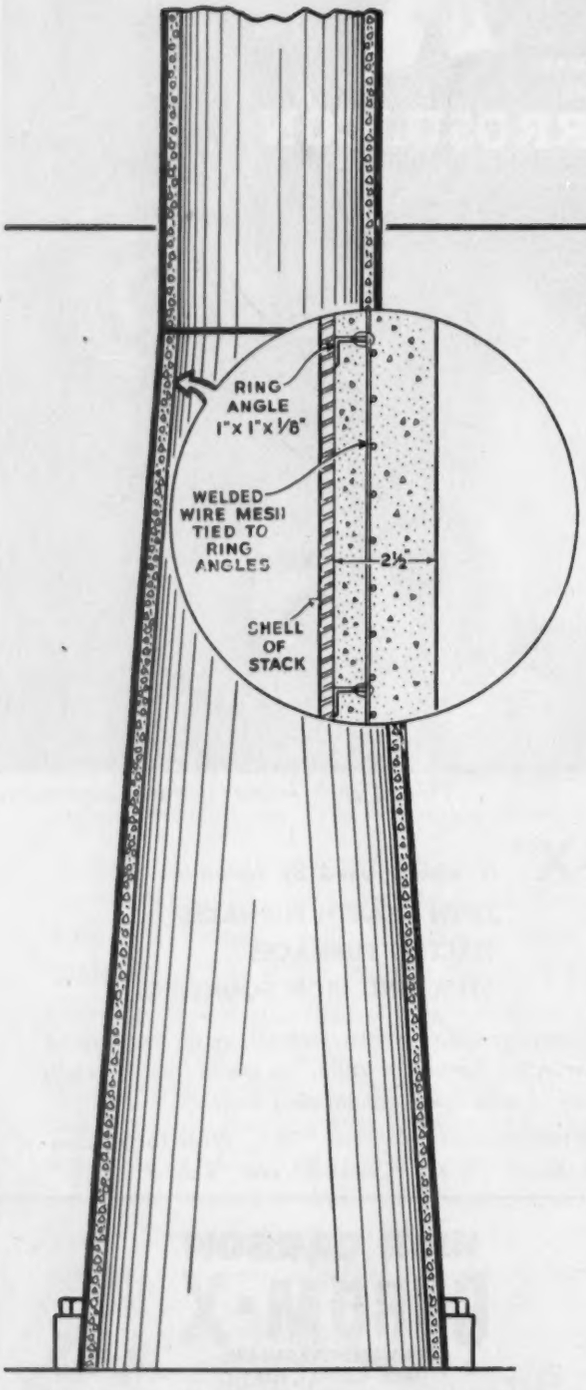
EXOTHERMIC FERROCHROMIUM

For furnace or ladle additions, giving higher recoveries and rapid uniform distribution of chromium in steel or iron.

***Sales Agents in U.S.A.* — MILLER & COMPANY, 332 South Michigan Ave., Chicago, Ill.**

INSURE YOUR STEEL STACKS FOR LONG LIFE



A LUMNITE LINING is Life Insurance for a Steel Stack

Stop oxidation, prevent the corrosive action of sulphurous flue gases, insulate the steel from high temperatures, and you have forestalled the enemies that destroy steel stacks. LUMNITE linings provide insulation and resistance to corrosion. In close contact with the steel, the jointless LUMNITE lining allows no "breathing"; aggressive condensate cannot reach the shell of the stack.

In new stacks or old, it's easy to install these LUMNITE linings. Reinforcing mesh is attached to the steel shell. A mixture of LUMNITE and insulating, corrosion-resistant aggregate is applied over the reinforcing. After 24 hours the lining is ready for service.

LUMNITE linings not only protect the steel but also improve performance. A 2½-inch insulating lining keeps up the gas temperature and boosts the draft. This thin lining can be placed in an old, unlined stack with no appreciable reduction in capacity. In addition, the new lining reinforces and stabilizes the steel shell.

For information on materials and methods used in protecting steel stacks with LUMNITE linings write The Atlas Lumnite Cement Company (United States Steel Corporation Subsidiary), Chrysler Bldg., New York 17, N. Y.

LUMNITE FOR REFRACTORY CONCRETE

Wire drawing is an operation which requires a high degree of skill. The specialized knowledge and long experience of Washburn men guarantee workmanship of the highest quality

Every coil of hot-rolled rod is checked carefully for pipes, seams, or laps. Imperfections are much easier to detect at this point than after the rod is drawn into fine wire

Highly scientific tests, plus the common sense of experienced and skilled Washburn workmen, assure uniformity of size, quality and tensile strength

Quality Plus

Washburn research and Washburn workmanship have developed a steel that meets the most exacting needs; a steel that definitely replaces Swedish steels!

Washburn quality begins in our own steel mill. To obtain closer control, to assure clean, uniform results, Washburn steel is made in *small heats and cast in small ingots!*

WASHBURN WIRE CO., NEW YORK CITY

WASHBURN

Clean, Uniform Billets - Strip - Rectangular, Round and Flat Rods - Tempered and Untempered Flat and Round High Carbon Wires.

HOW UP-TO-DATE are you on ALUMINUM?

. . . now offers new combinations of advantages . . . new alloys in all forms . . . from a great new source!

Consider aluminum today in terms of recent advancements—particularly the new lightweight, high-strength aluminum alloys developed by Reynolds metallurgists.

For example . . .

CONSIDER R301, the new Reynolds alloy with a typical tensile yield strength of 60,000 p. s. i., superior workability, good corrosion-resistance, excellent spot-welding characteristics.

CONSIDER R303, another new Reynolds alloy with even higher tensile yield strength—higher, in fact, than any aluminum alloy used in the past. In addition, R303 has splendid corrosion-resistance.

CONSIDER ALSO R317, Reynolds new free-machining alloy.

And finally, consider all Reynolds aluminum alloys in terms of these additional advantages . . . ease of fabrication and assembly . . . thermal and electrical conductivity . . . heat and light reflectivity . . . non-magnetic, non-sparking and non-toxic qualities . . . pleasing appearance . . . new low costs.

Consider Aluminum—Consult Reynolds.

Keep your dollars fighting . . . Buy MORE War Bonds

REYNOLDS METALS

REYNOLDS ALUMINUM

The Great New Source of

INGOT • SHEET • SHAPES • WIRE • ROD • BAR • TUBING • PARTS • FORGINGS • CASTINGS • FOIL • POWDER

7383-AI-1

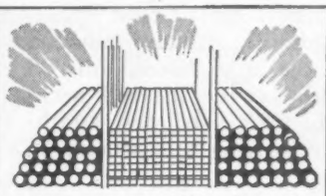
From Rivets to Armor Plate: Consult Reynolds

Today Reynolds Metals is sweeping forward as the nation's great new source of all forms of aluminum. Let Reynolds demonstrate what this all-out, tradition-free effort can do for you. Service offices located throughout the country.

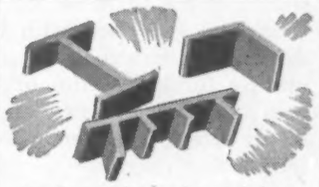
See the Reynolds catalog in Sweet's—or write for bulletins outlined in the paragraphs below.

SHEET AND PLATE. Standard gauges, sizes, alloys. Special items. Bulletin 22-A gives specifications, ordering data, etc. 8 pp.

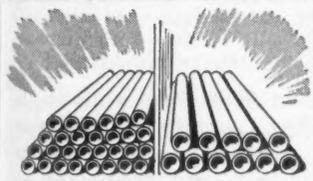
WIRE. Cross sections less than ⅛ inches. See Bulletin 31-A for specifications, ordering data, etc. 12 pp.



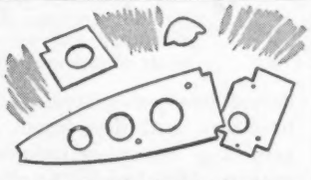
ROD AND BAR. Sizes from ⅜ inches to 8 inches for forging and machining. Bulletin 31-A gives complete information.



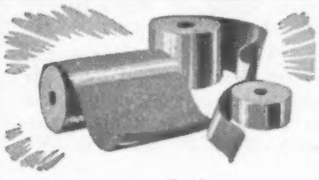
SHAPES. Rolled and extruded sections to fulfill individual needs. See Bulletin 35-A for full information. 8 pp.



TUBING. Seamless. Closely controlled as to quality and dimensions. See Bulletin 17-A. Specifications, ordering data, etc. 8 pp.

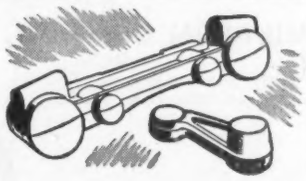


PARTS. Fabrication at aluminum source saves manpower, plant space, scrap and transportation. Ask for further information.

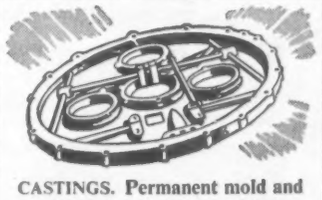


FOIL. For years the largest producer of light-gauge aluminum for packaging, technical and insulation purposes. Bulletin on request.

POWDERS AND PASTES. For aluminum coatings. Bulletin 21-A gives forms, applications, evaluations. 20 pp.



FORGINGS. Production capacity up to 2,000,000 units per month. Ask for details.



CASTINGS. Permanent mold and sand. Produced in one of industry's most modern plants. Ask for further information.

FREE! Many of the bulletins mentioned above belong in your files for quick reference. Please use coupon in requesting.

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Aluminum Division
2520 South Third Street, Louisville 1, Kentucky
Send post-free material I have listed:

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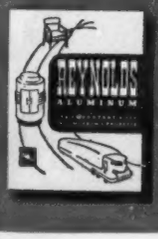
FIRM_____
STREET_____ TITLE_____
CITY_____ ZONE_____ STATE_____



DON'T MISS THIS!

"Reynolds Aluminum, its Important Role in Tomorrow's Products," is of direct interest to every one concerned with design and production. 16 pages packed with useful information.

NEW GRINDER ATTACHMENT *floats* 63-TON ROLLS ON OIL FILM

63 TONS

Two Farrel 60" heavy-duty roll grinders installed in the plant of the Geneva Steel Co. at Provo, Utah, are equipped with hydraulic pressure-relieving devices which actually float the huge 63-ton rolls on oil. By forcing a film of oil between the roll necks and the bearing surface of the neck rests, these attachments reduce the tremendous starting load caused by inertia and friction.

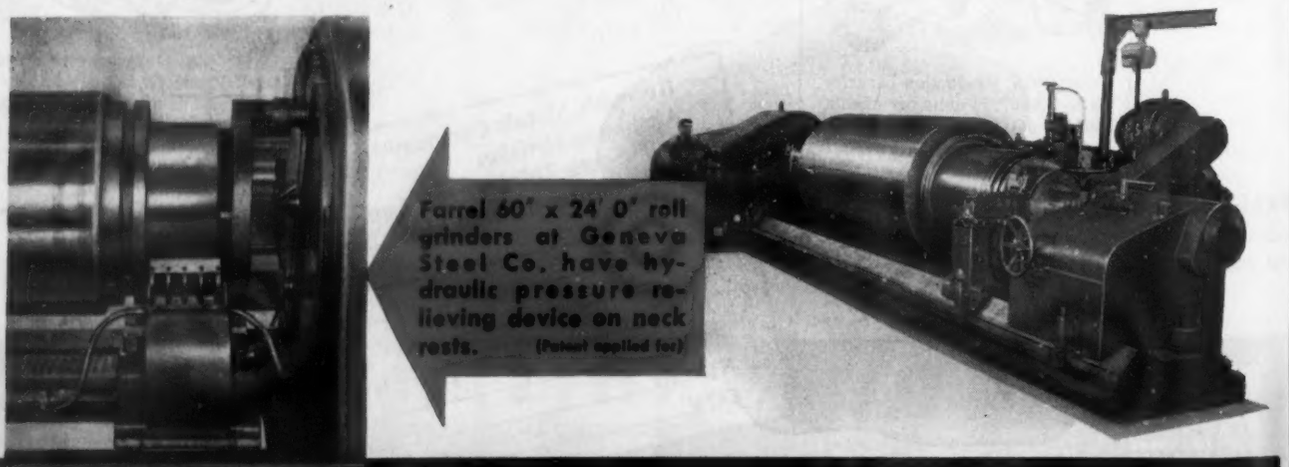
The pressure-relieving device is one of many features which enable Farrel roll grinders to perform extra-heavy duty with maximum efficiency and accuracy and with minimum wear. Here are some of the others:

1. GRINDING WHEEL SPINDLE — Of large diameter for rigidity under working load — made of high grade alloy steel, heat treated and precision ground — mounted in adjustable bearings, automatically lubricated and driven by multiple "V" belts.
2. SMOOTH, VIBRATIONLESS CARRIAGE TRAVERSE—Driven by adjustable, speed-reversing motor through Farrel-Sykes continuous tooth herringbone gear and worm reduction, the smoothest type of mechanical drive known for machine tool carriages.
3. AUTOMATIC CROWNING AND CONCAVING DEVICE—Farrel patented single eccentric type—easily set to produce exact curvature desired.
4. CENTRALIZED CONTROL—Operator can control entire operation of machine without moving from control station at center of carriage—push buttons, rheostats and hand-wheels are within easy reach.
5. INVERTED "V" WAYS — Cast separately from bed of special alloy iron, exceptionally resistant to wear, automatically flood lubricated, covered by flexible metal guards to exclude dirt and grit.
6. SMOOTH HEADSTOCK DRIVE—Faceplate driven by adjustable-speed motor through multiple "V" belts. A self-contained, compact, rugged unit which contributes materially to fine finish.
7. AUTOMATIC LUBRICATION—Grinding wheel spindle, carriage drive and carriage ways are continuously and automatically lubricated to prevent wear of moving parts and preserve initial precision.

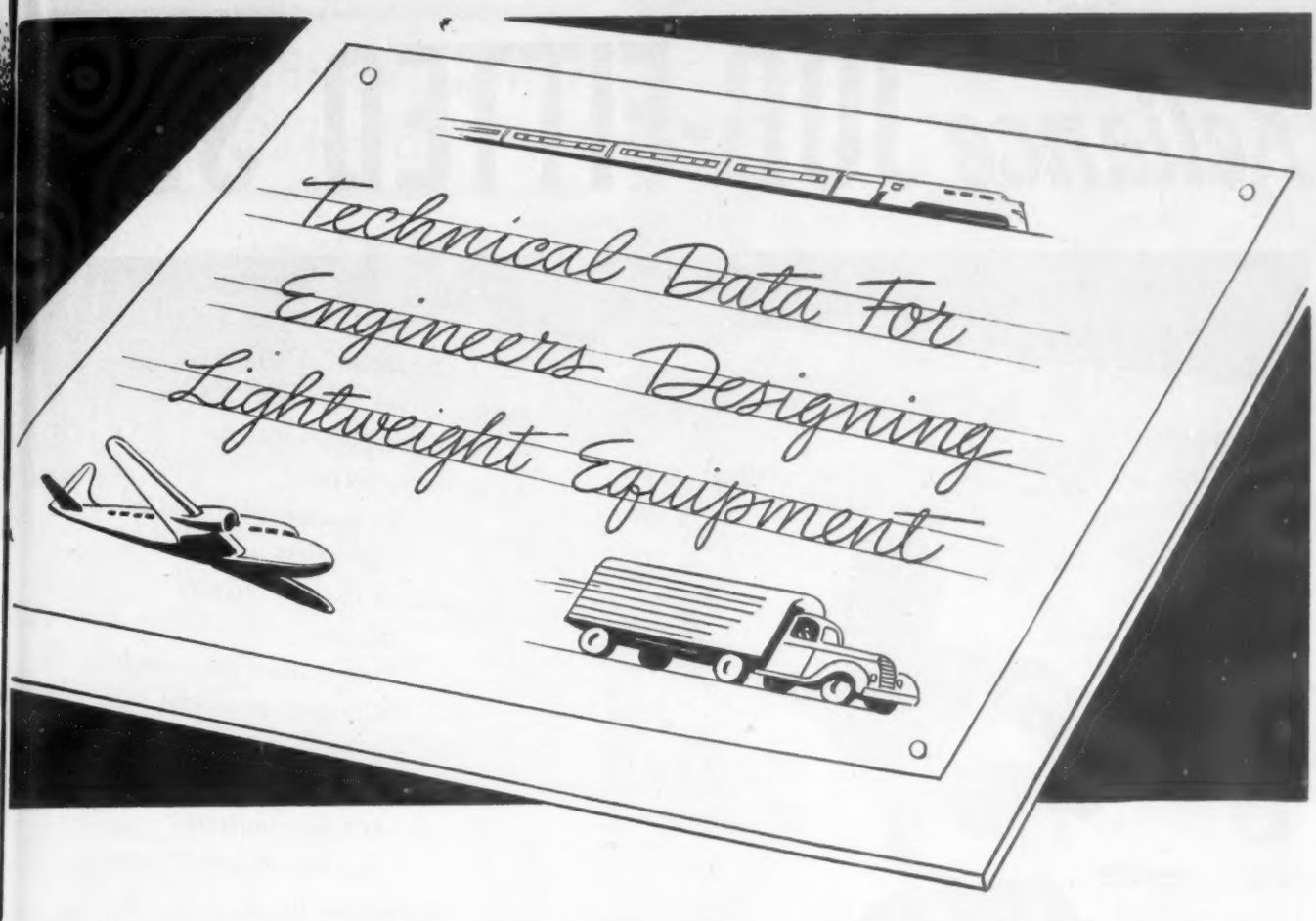
Farrel heavy-duty roll grinders finish rolls with high precision and fine finish. They can also be used for grinding heavy cylindrical parts requiring accuracy within close limits. Available in six standard sizes to take maximum diameters of 24", 28", 36", 44", 50" and 60", and any length required between centers.

For complete information write for Bulletin No. 111.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONN.
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles


Farrel 60" x 24' 0" roll grinders at Geneva Steel Co. have hydraulic pressure relieving device on neck rests. (Patent applied for)

Farrel-Birmingham



• You can get much useful information on the physical properties of the high-strength cold-rolled austenitic alloy steels by writing for the technical publications listed below.

All these papers are based on studies made at the research laboratories of Electro Metallurgical Company, and are part of a broad development program to find new or improved ways of using stainless and other alloy steels and irons.

Buy United States War Bonds and Stamps

"The Stress-Strain Characteristics of Cold-Rolled Austenitic Stainless Steels in Compression as Determined by the Cylinder Test Method" — describes a method for determining compressive strength of thin sheets of these steels; it is illustrated by curves from the tests on typical grades of stainless steel.

"Effects of Low-Temperature Heat-Treatment on Elastic Properties of Cold-Rolled Austenitic Stainless Steels" — a 16-page paper, illustrated by charts and graphs, on the results of various low-temperature heat-treatments on the mechanical properties of cold-rolled austenitic stainless steels.

"High-Manganese Austenitic Steels" — physical data on new high-strength steel, for possible use in aircraft construction and in other lightweight structures.

"Tension and Compression Stress-Strain Characteristics of Cold-Rolled Austenitic Chromium-Nickel and Chromium-Manganese-Nickel Stainless Steels" — a compilation of important physical data on austenitic chromium-nickel and chromium-manganese-nickel steels.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

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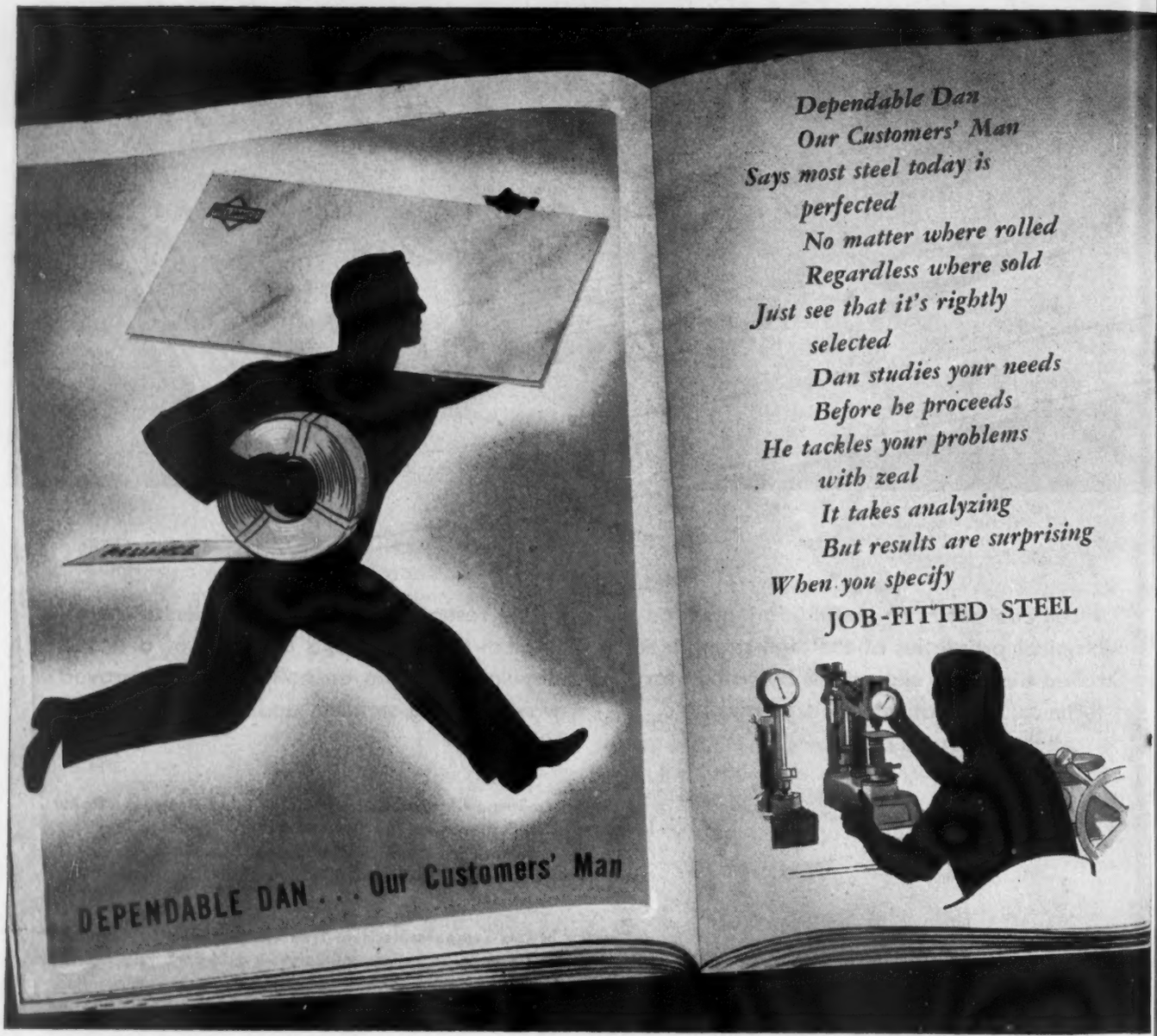
Trade Mark
Ferro-Alloys & Metals

Reliance JOB-FITTED Steel



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THESE ARE THE TIME-SAVING FEATURES YOU'LL NEED IN . . .

YOUR NEXT AUTOMATIC LATHE

● Changes in production requirements, changes in part design and changes in processing methods need not obsolete your turning equipment. That's why many manufacturers are buying Sundstrand automatic lathes at a time when it's difficult to anticipate future needs. They offer the advantages of multiple tool turning on *both* short-run and mass production turning. Here are seven reasons why:

❶ QUICK CYCLE CHANGEOVER

So that adjustments for various sizes and types of parts can be made rapidly with a minimum of down-time of the machine.

❷ SIMPLICITY OF TOOL ADJUSTMENT

So that operators or set-up men can readily learn to make tool set-ups and changeover.

❸ WIDE RANGE OF CARRIAGE CYCLES

Easily adjusted for many different sizes of parts and types of tool uses.

❹ WIDE FEED AND SPEED RANGE

Suitable to cover a wide range in size of parts to be machined.

❺ ADEQUATE HORSEPOWER

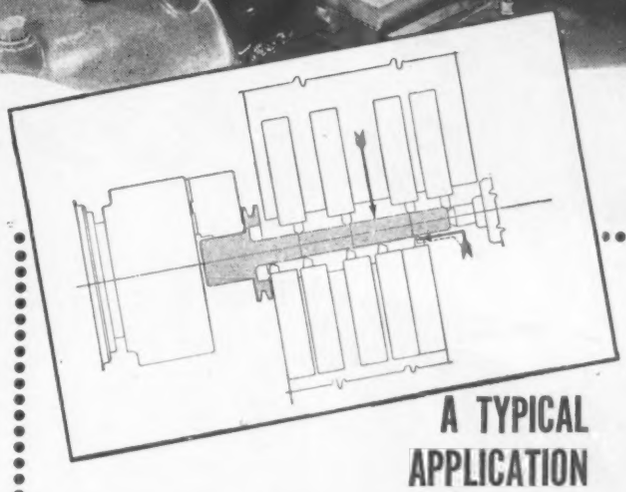
So that multiple tooling can be used to shorten cutting time; also so that cemented carbide and other modern cutting tools can be used to capacity.

❻ AUTOMATIC CYCLING

For accurate duplication to close limits of all parts in the lot. Also so that operator can, on occasion, run more than one machine.

❼ HIGH RAPID TRAVERSE RATE

So that cutting tools can be advanced to the cut and returned after the cut in the least possible time.



A TYPICAL APPLICATION

OVER 33 HOURS SAVED TURNING A LOT OF ONLY 200 PARTS

● This airplane engine tail shaft is produced in lots of 200, requires three turning operations. It used to take 13 minutes to complete the operation shown on the tooling diagram. The same operation performed on a Sundstrand requires only 3 minutes.

● The fast automatic operating cycle and high rapid traverse rate of 250 inches per minute often slash half the time from previous production rates. In addition modern cutting tools can be worked to capacity on these amply powered lathes.

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Over 20 different turning jobs are described in this 44 page booklet. Short-run, mass production and special turning jobs are all described in detail. Write for your copy today. Ask for Booklet No. 737

ARMY E NAVY

SUNDSTRAND MACHINE TOOL CO. ROCKFORD ILLINOIS U.S.A.

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BRUSHES

"Even Trim" Spiral Wound Brushes Engineered to your specific needs. A highly trained engineer is at your service for consultation without obligation.

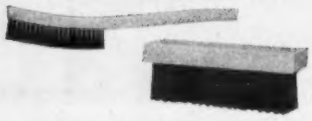
A typical installation showing a brushing operation at one of the large steel plants.

INDUSTRIAL BRUSHES of all Types For BETTER PRODUCTION

PERFECT BALANCE

Carefully controlled distribution of the brushing stock gives perfect balance and maximum efficiency to these power driven rotary brushes. Wire or fiber. May be used as individual sections or in assemblies.

UNI-FILL



These scratch brushes are uniformly filled. They are trimmed with a "bite" to give the best performance obtainable with hand scratch brushes.

RED CENTER

Red Center Wheel brushes made in various diameters and degrees of stiffness for many different applications are sturdy in construction and in perfect balance.

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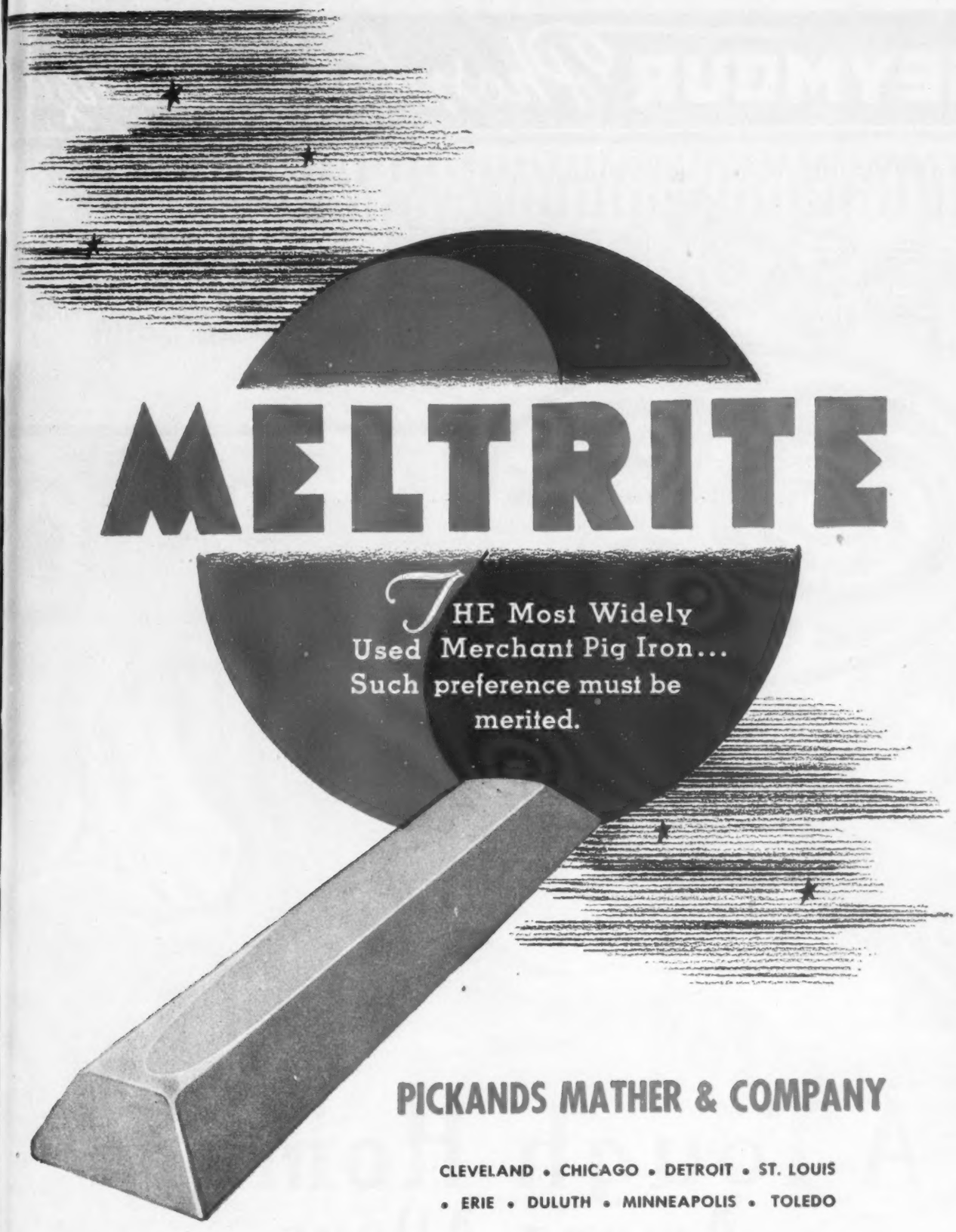
PLATE GLASS COMPANY
Brush Division
3221 Frederick Avenue · BALTIMORE 29 · MD.



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THE Most Widely Used Merchant Pig Iron... Such preference must be merited.

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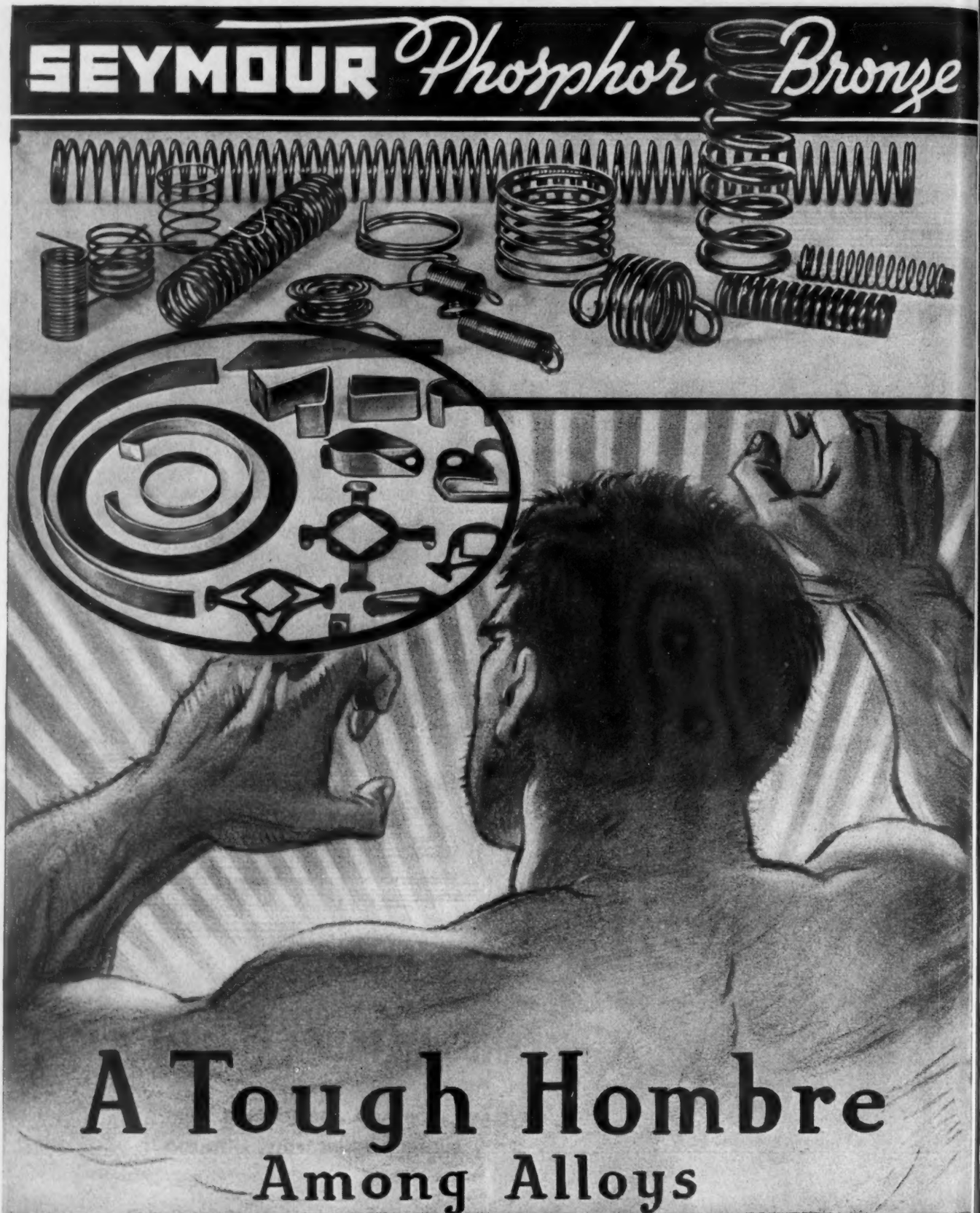
SEYMOUR *Phosphor Bronze*

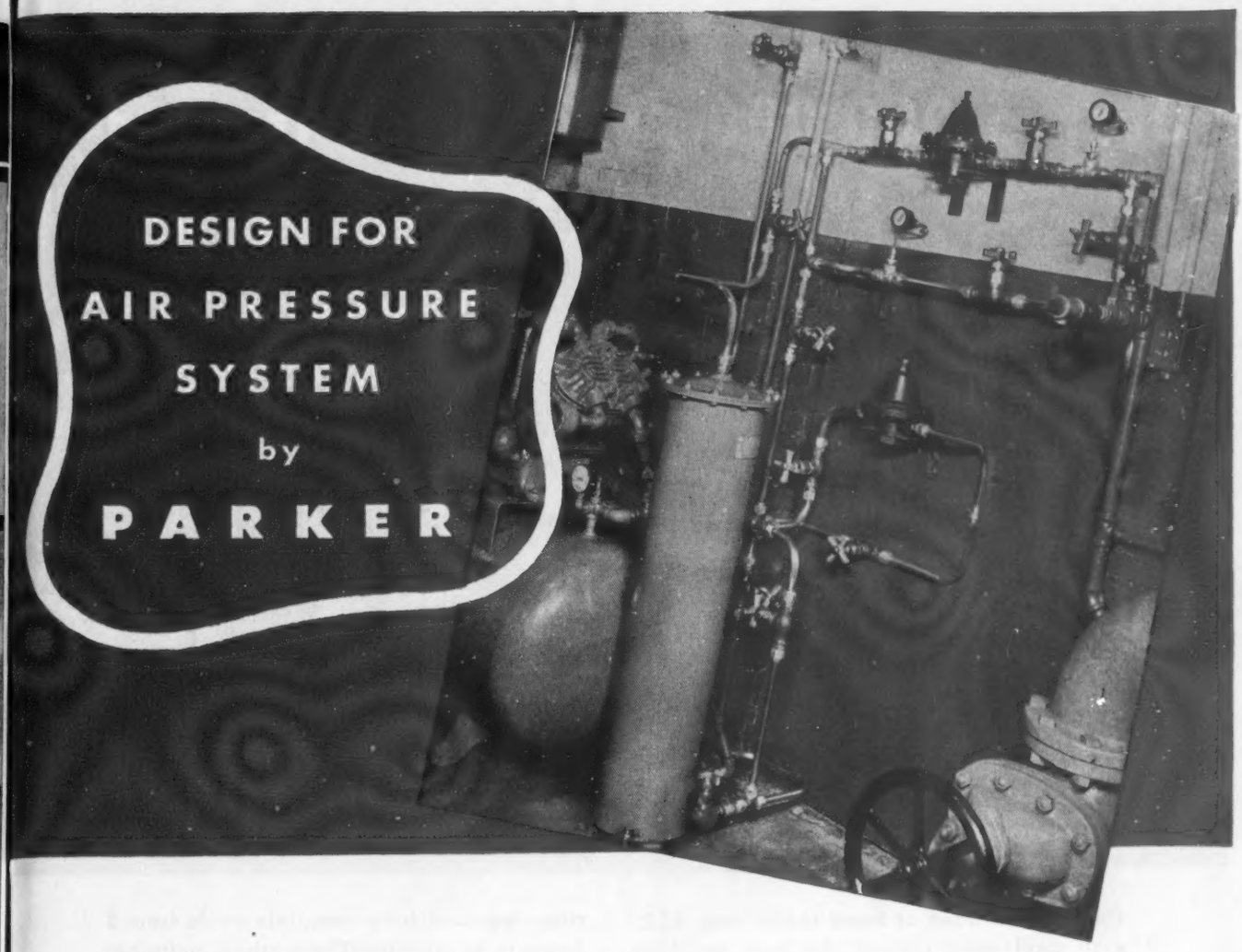


A Tough Hombre
Among Alloys

Stubbornly resistant to corrosion. Extremely tough—withstands abrasion and impact to a remarkable degree. Undergoes hundreds of thousands of "fatigue" cycles without appreciable deterioration. Sheet, wire and rod. Samples on request.

THE SEYMOUR MFG. CO., 51 FRANKLIN STREET, SEYMOUR, CONN.

NON-FERROUS ALLOYS SINCE 1878



Let's take a frank look at the things that make the controls work—on this air pressure system or on *your* machines.

Here are the specifications for the kind of tubing system that sound Fluid Power Engineering calls for:

Streamlined Flow—for minimum pressure drop, freedom from obstructions and minimum demand on power source.

Space Saving—making best possible use of available space.

Easy Accessibility—for quick and inexpensive service and maintenance.

Fewer Joints and Connections—for greater protection against the possibility of leaks, even under conditions of severe vibration, high pressures and abuse.

Parker Fluid Power engineers, for more than twenty years, have been designing these systems — for aircraft, motor vehicles, machine tools, refrigeration and process equipment.

We've been building the valves and fittings and the fabricated tubing, for Fluid Power installations, and for fluid transmission.

Whatever you make or plan to make, this broad experience is yours to command. Consult with a Parker engineer, especially in the planning stage. For this service, or for more information, write to The Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio.

THE
PARKER
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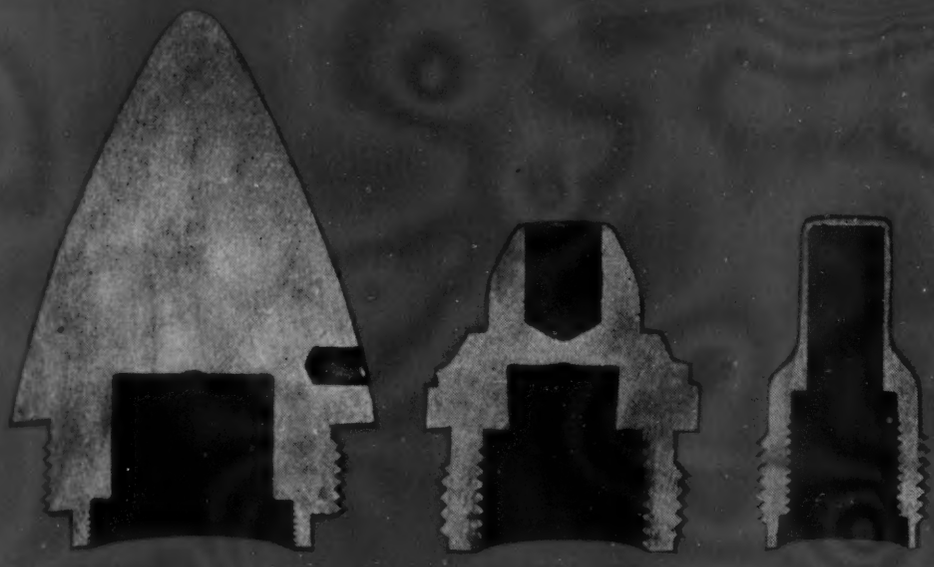
CLEVELAND • LOS ANGELES
FLUID POWER ENGINEERING

Over 5,000,000 fuses heat treated—



NO DISTORTION!

Cutaway sections of fuses made from SAE 4140 steel show plainly the heat treating problem. Irregular sections, thin and thick, plus square corners, are invitations to distortion or cracking.

Yet more than five million of these fuses have been heat treated by an "Interrupted" quench in Houghton's Mar-Temp Salt, without any rejection attributable to the heat treatment. Writes the heat treating supervisor in summing up results:

"The total number of pieces run, the quality of the work, and our ability to maintain production for 24 hours a day, seven days a week, I would say is quite a compliment for Houghton's Salt."

The heat treatment follows finish machining. Not only has this method eliminated quench cracks, but it also has reduced the time required for a complete cycle from 3 hours to 48 minutes. The method includes:

Preheat—open flame

High heat in Liquid Heat at 1550° F.

Quench in agitated Mar-Temp Salt at 625° F.

Draw in Draw Temp at 850-900° F.

Each step requires 12 minutes. One complete rack of 20 fuses comes off the line every 3 minutes. Production is double the original estimate, which speaks very well for salts, furnaces and the whole process.

Martempering, austempering or isothermal quenching in salt may be your answer to a present problem. Let's talk it over. E. F. HOUGHTON & CO., 303 W. Lehigh Avenue, Philadelphia, and all principal cities.

SALT-QUENCH IN HOUGHTON'S

MAR-TEMP

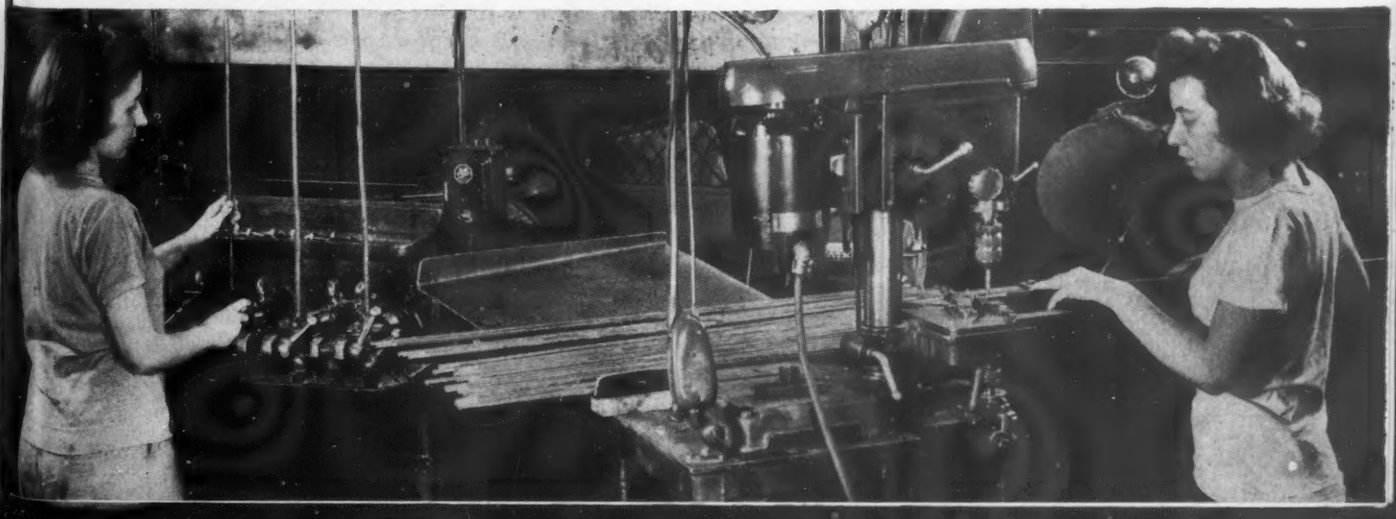
"mr. five by five" or "six—six"

Because of the versatility of our modern equipment, Buffalo Bolt is in a position to supply you with any size or shape circle Ⓑ fastener—standard or special—for your present war effort or post-war planning.

BUFFALO BOLT COMPANY

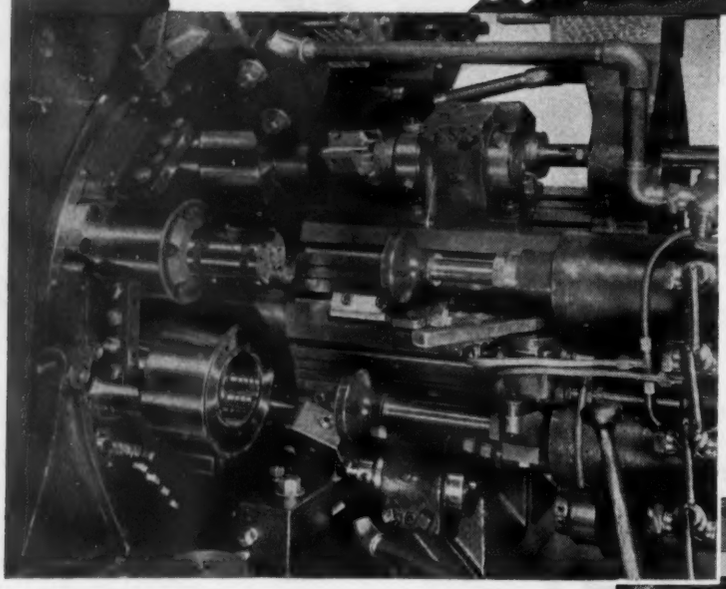
NORTH TONAWANDA, NEW YORK
SALES OFFICES IN PRINCIPAL CITIES

Drilling the rods for cartridge cases. Millions have been turned out by Buffalo Bolt Company since Pearl Harbor.



WANTED:

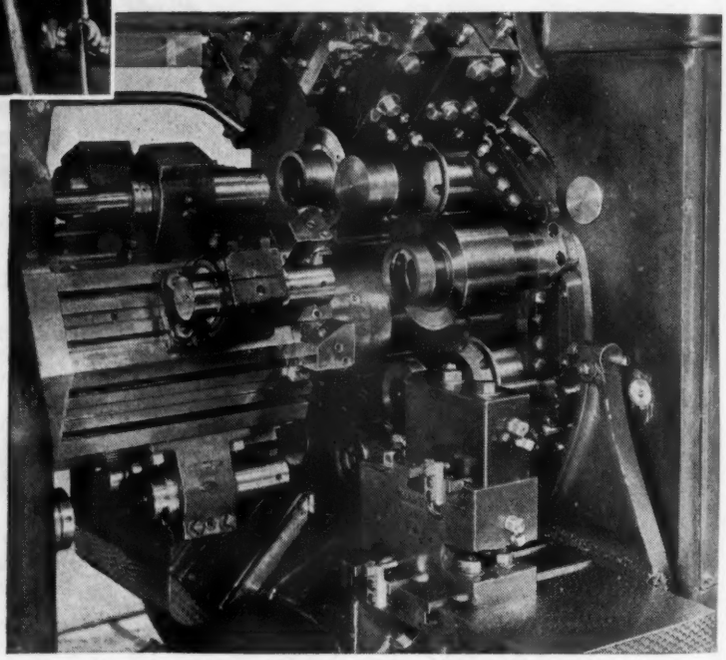
A Machine that can work with 15 tools at the same time



If you want to run an ad like that, here is an applicant for the job.

It's an Acme-Gridley Chucking Automatic —a machine built for one reason, to cut costs by turning out more precision work in less time.

Large, accessible tooling area permits use of more tools working together, with sustained accuracy at high speeds. Efficient chip removal, less operator fatigue. Multiple tooling combines operations—saves time, saves tools, saves floor space, saves investment.



Here is the 15-handed machinist at work. The job—machining an annealed cast-iron motor piston, on a 6" 8-spindle Acme-Gridley Chucker.

First operations (shown here) 15 tools, double indexing, with alternate internal and external chucking, permits rough finishing both ends at one setup.

Second operations, 14 tools, double indexing and multiple tooling finishes two pieces at same time.

29 tools required, only two setups needed.

Write us about your chucking jobs. We'll help you get the costs down.

The NATIONAL ACME CO.

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley 4-6 and 8 Spindle Bar and Chucking Automatics • Single Spindle Automatics • Automatic Threading Dies and Taps • The Chronolog • Limit, Motor Starter and Control Station Switches • Solenoids Centrifuges • Contract Manufacturing

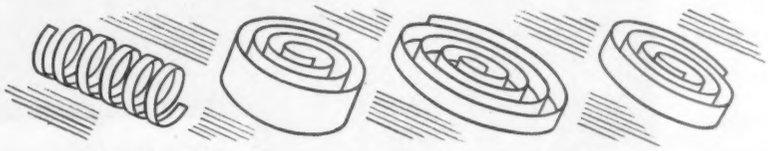
It's always *"springtime"* in your automatic toaster

WHEN you set your toaster for light, dark, or medium, a *steel spring* times it for the shade of brown you like.

Many of these springs are made from special steels developed here at Athenia ... steels engineered to meet rigid specifications. Smoothly polished surface is one important requirement so each layer of the spring may slide easily over the other. High elasticity is necessary to assure long life and freedom from permanent distortion. Tensile strength helps prevent cracking from over compression. And uniformity of structure is essential for even pull and accuracy of timing.

And for clocks, typewriter carriages, fishing reels, mark-time switches, and many other requirements, Athenia is producing the *precise spring for the job,* either in the form of wound springs or steel strip.

Providing a combination of properties to meet particular requirements has been the work of Athenia for more than 30 years. If you have a precision steel problem that involves stock in widths of 1/16" to 6½", thicknesses of .0015 to .062, annealed, cold-rolled, tempered or tempered polished and colored, try Athenia personalized service.



NS

The ATHENIA STEEL Company

DIVISION OF NATIONAL-STANDARD

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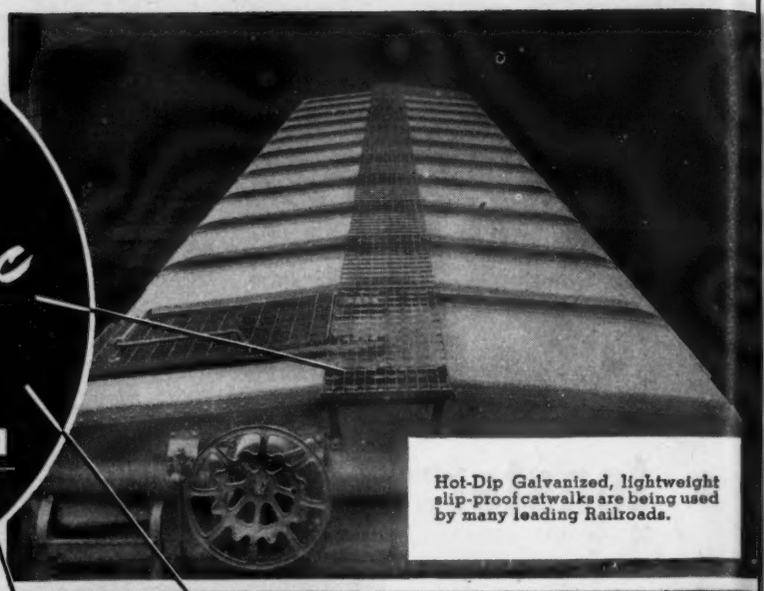
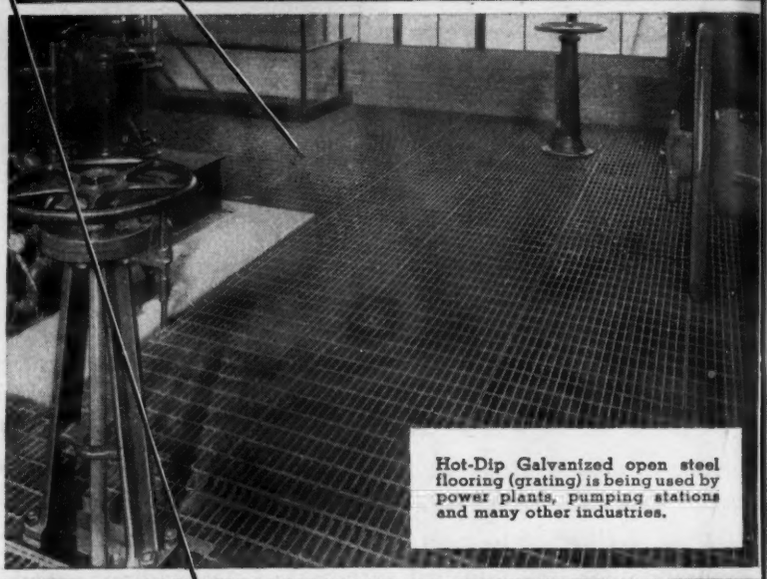
Hoboken, N. J.
LITHOGRAPHING AND SPECIAL MACHINERY

Dipped in Molten Zinc

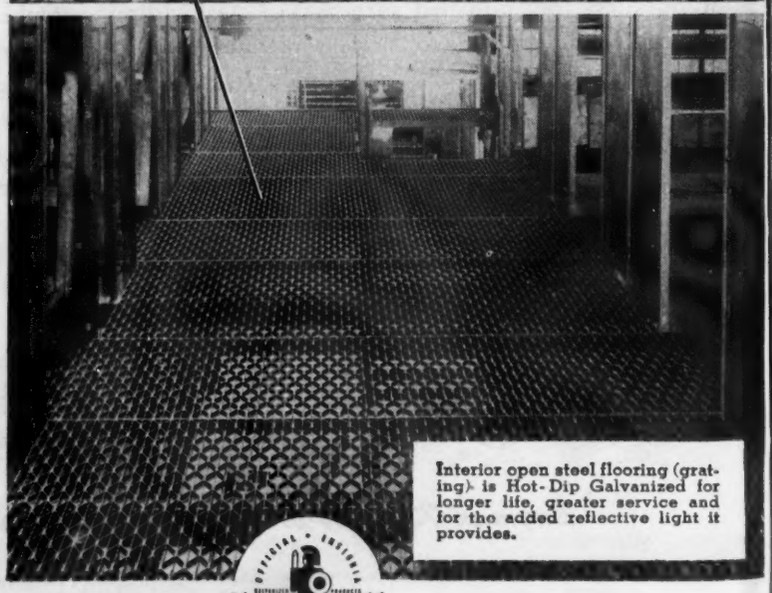
FOR THE UTMOST IN RUST PREVENTION



Hot-Dip Galvanized, lightweight slip-proof catwalks are being used by many leading Railroads.



Hot-Dip Galvanized open steel flooring (grating) is being used by power plants, pumping stations and many other industries.



Interior open steel flooring (grating) is Hot-Dip Galvanized for longer life, greater service and for the added reflective light it provides.

More and more, users of open steel flooring and grating are writing—"Hot-Dip Galvanized" into their specifications. They have learned from experience and proven facts that the positive fusion of molten zinc with the base metal by the Hot-Dip Galvanizing method provides the *utmost in rust prevention.*

The life and service of any iron or steel product or installation which is exposed to the hazards of rust and corrosion are increased years and years beyond normal expectancy when protected by Hot-Dip Galvanizing.

Millions of dollars have been saved by this time-proven process, saved in replacement and upkeep costs. The time to effect savings is when you buy.

Specify—Hot-Dip Galvanizing by a member of this Association. There is one near you who will gladly discuss rust and corrosion prevention. Write—today, the American Hot Dip Galvanizers Association, Inc., First National Bank Building, Pittsburgh 22, Pennsylvania.

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HOT-DIP GALVANIZING
AMERICAN HOT-DIP GALVANIZERS ASSOCIATION, INC.

For the best Zinc Coating **use** **hot-dip GALVANIZING**

Here's a practical, modern short cut to

GREATER WEIGHT SAVINGS

without sacrifice of STRENGTH or SAFETY

ELECTRUNITE tubular frame construction is the answer! It saves weight in buses, trucks and other types of equipment, because tubing has a higher strength-to-weight ratio than any other type of structural member. Less weight means increased revenue for the operator. More pay-load may be hauled without increase in consumption of power—or the same pay-load hauled with a reduction in operating costs.

While ELECTRUNITE tubular frames are light in weight, they also are strong, safe and rigid. They provide greater riding comfort, because they absorb ordinary road shocks and eliminate severe jolts. Collision damage is localized at the point of impact, due to the shock-absorbing qualities of tubular construction.

Republic ELECTRUNITE Tubing—cold formed from flat-rolled steel and electric resistance welded into tubing—is consistently uniform in wall thickness, diameter, roundness and workability. It is available in carbon steels from 3/16" to 5" O.D. from 3 to 22 gauge, and in stainless steels from 3/8" to 3" O.D. from 13 to 22 gauge . . . in round, square, rectangular and other shapes.

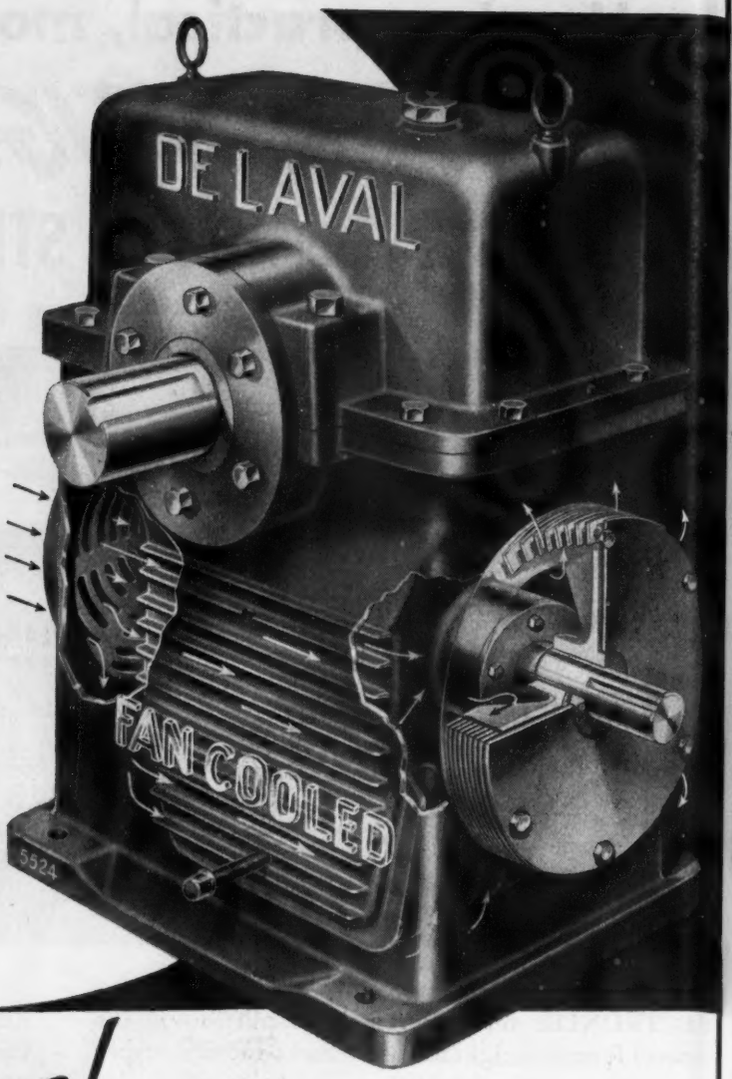
For more information on the many other advantages of welded ELECTRUNITE tubular frame construction, see your equipment builder or write directly to:

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION • CLEVELAND 8, OHIO
Export Department: Chrysler Building, New York 17, New York

Republic
ELECTRUNITE
Reg. U. S. Pat. Off.
TUBING

Mechanical, Aircraft, Stainless Steel and Rail Steel Tubing—Boiler, Condenser and Heat Exchanger Tubes

NEW DE LAVAL FAN COOLED WORM GEAR



Lifts ceiling on capacity ratings!

Heretofore the capacity of non-cooled worm gears has been limited, not by the strength of materials, but by the ability of the casing to liberate heat. With fan-cooling, the capacity is approximately doubled at speeds at 1750 r. p. m. Higher ratings, in turn, permit the use of smaller, lighter, and less expensive units without sacrifice of durability or reliability. • A fan mounted directly upon the high speed shaft draws air at high velocity around and under the ribbed inner wall of the oil reservoir. The ribs increase the heat dissipating surface, while the outer housing serves to confine and direct the air stream, thus cooling the unit most efficiently. • Stock models will soon be available. Ask to have your name placed on our mailing list for literature.

1151

TURBINES • HELICAL GEARS and WORM GEAR SPEED REDUCERS
CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS and COMPRESSORS • IMO OIL PUMPS

WORM GEAR DIVISION
DE LAVAL
STEAM TURBINE COMPANY · TRENTON 2, NEW JERSEY

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Weirzin offers you a real business advantage. It enables you to manufacture a definitely better product at an appreciably lower net cost.

ONE SAVING . . . The high corrosion resistance of Weirzin means a substantial saving in inventory *plus* reduced cleaning costs and the *elimination* of pickling and buffing operations.

ANOTHER SAVING. Because of its extremely tight malleable coating and highly ductile base sheet Weirzin takes deep drawing and severe fabrication without damage to its protective surface—and retains its excellent base for subsequent finishes . . . *and* because it is available plain or Bonderized in coils up to 35″ widths Weirzin lends itself to fast, automatic production equipment . . . Write for test sample.

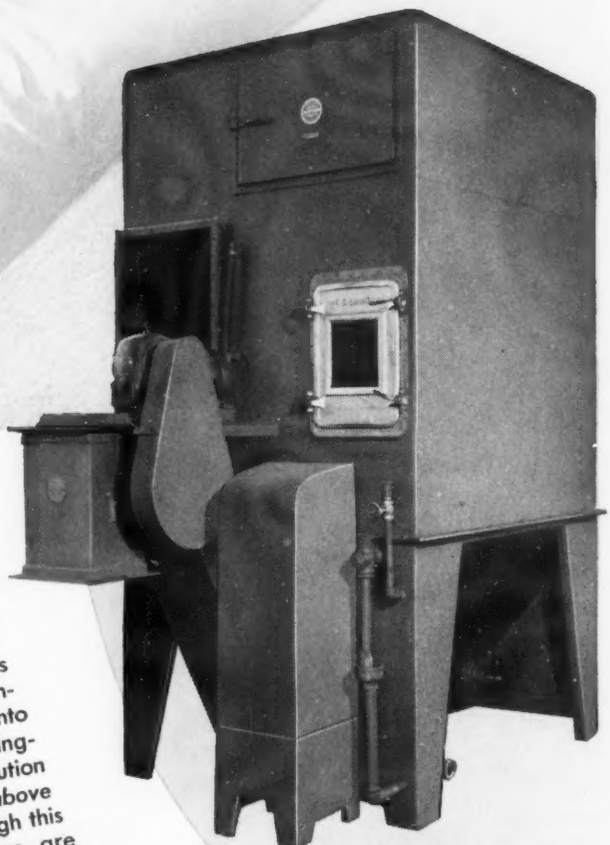
WEIRTON STEEL CO.

WEIRTON, W. VA.

Division of **NATIONAL STEEL CORPORATION** *Executive Offices · Pittsburgh, Pa.*

DUST... *insidious enemy of workmen and work...*

PERMANENTLY PUT OUT OF CIRCULATION... *under water*



with the MAHON Hydro-Foam SYSTEM of dust elimination

Even the finest dust particles—the most dangerous to workmen and work—are captured and permanently trapped under water. This is how the mechanism works. By means of a powerful suction-exhaust fan—the only moving part—dust-laden air is automatically drawn from working areas into the Collector, where the air stream, directed downward at high velocity, carries the heavier dust particles into the solution in sludge tank located in the base. This impinging action of air stream against the sludge tank solution aereates the solution and forms a bed of foam above the water line. As the air stream passes through this foam bed the more minute dust particles are "smothered" and settle to the bottom of sludge tank with the heavier dust previously removed. Clean air only is exhausted from the Collector.

- **AUTOMATIC OPERATION**
- **NO PUMPS**
- **NO CLOTH SCREENS**
- **NO SPRAY NOZZLES**
- **NOTHING TO WEAR OR REPLACE**

Write for descriptive folder

REMOVES THE DUST FROM INDUSTRY

THE R. C. MAHON COMPANY

DETROIT 11 — CHICAGO 4

Designers and Manufacturers of Metal Cleaning Machines, Rust Proofing Machines, Hydro-Filter Spray Booths, Ovens of All Types, Filtered Air Supply Systems, Hydro-Foam Dust Collectors—and Many Other Units of Special Production Equipment—Including Complete Finishing Systems.

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STEEL

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NEWS

Scarcity of Materials Hampers Reconversion to Civilian Goods Production 75
Canadian Reconversion to Civilian Goods Production Pushed 77
Western Interests Urge Early Action on Fontana Steel Mill 78
Prize-winning Technical Papers Read at Blast Furnace Meeting 79
Baltimore District's War Production Pace Little Changed 80
April Munitions Output Off but Only One Per Cent Behind Schedule 81
Restoration of Freedom Is Held Needed To Remove Business' Fear 82
State Department Hopes to Banish Restrictive Practices of Cartels 88
Light Metals Industry Conference Planned at Seattle June 21-22 97

TECHNICAL

Improved Design Simplifies Stamping of "Butterfly" Cases 104
Fragmentation bomb assembly aided by special jigs and fixtures

Back-Pack Oxyacetylene Cutting Outfit Extends Utility of Welder 107
Light-weight, portable unit reaches "tight" spots on damaged ships

Utilizing Gas Immersion Tubes for Industrial Heating 108
Data on design and applications is index to peak efficiency

Cast and Forged Steels Compared 113
Limited forging of cast blanks sometimes effective

Using Iron Mortar To Absorb Rolling Mill Vibration 118
Increased strength and controlled shrinkage are provided

Individual Oil Quenches for Desired Hardness in Machine Parts 122
Ideal is milder flowing quench with proper quantity and speed

Palletizing Shipments of Cartridge Tanks 126
Labor and material requirements drop, costs cut drastically

FEATURES

As the Editor Views the News 71
Present, Past and Pending 77
Transition Topics 83
Windows of Washington 84
WPB-OPA Orders 89
Mirrors of Motordom 91
Men of Industry 94
Obituaries 96
Wing Tips 98
Industrial Equipment 150
The Business Trend 180
Construction and Enterprise 200

MARKETS

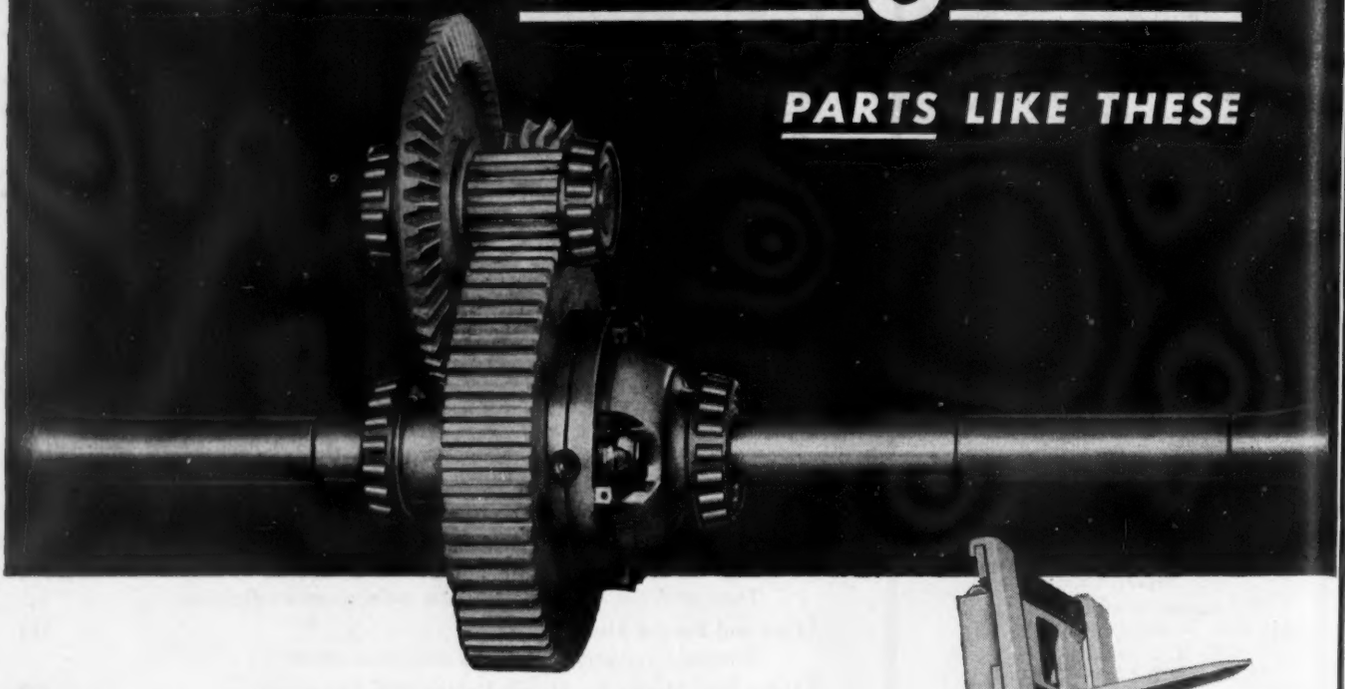
Civilian Steel Prospects for Third Quarter Meager 185
Market Prices and Composites 186

Index to advertisers 216

NEXT WEEK...

The Development and Prospects for Resistance Welding
Corrosion Preventives Protect Metal Parts
Controlling Quality by Statistical Methods
How White Motor Co. Checks Steel Analyses
Four-Zone Conveyor Oven Affords Dust-Free Finishing

NICKEL ALLOY STEELS Strengthen PARTS LIKE THESE



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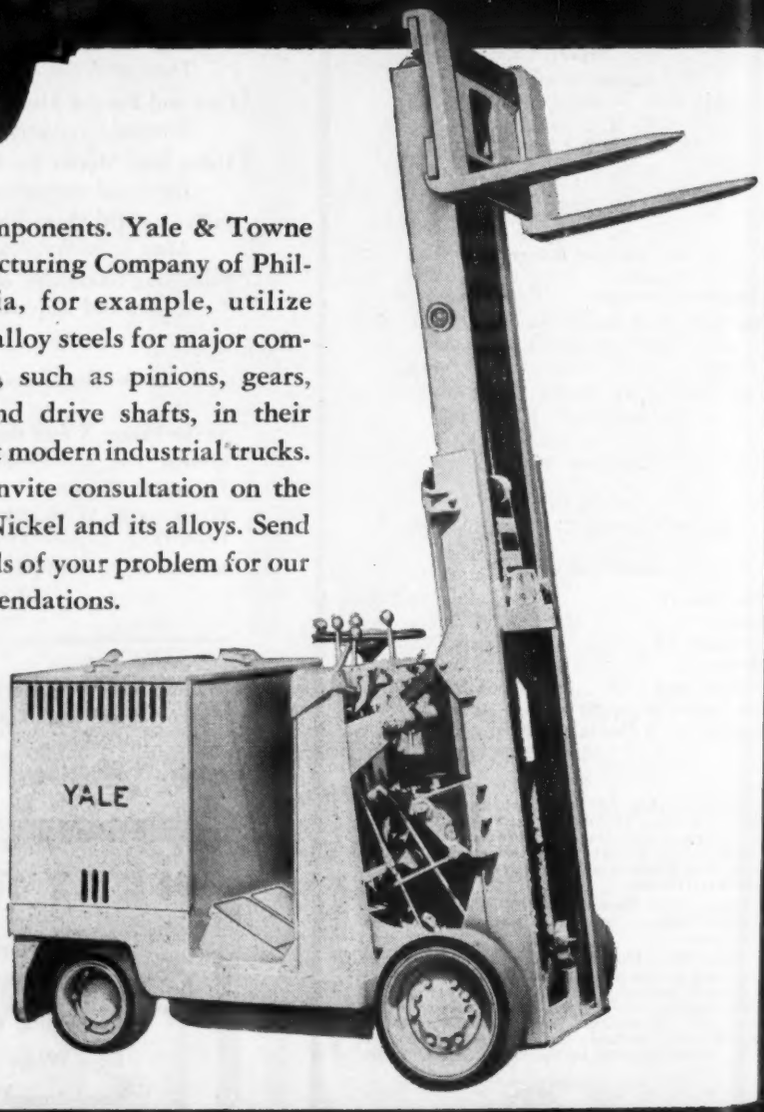

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

STEEL
June 4, 1945

The Reply Diplomatic!

Imagine yourself in this situation: As the head of an industrial corporation you are looked upon in your community as a typical spokesman for industry. You find yourself in a small group of local acquaintances—a dentist, grocer, postman, school teacher, clergyman, garageman and hotel proprietor. One of them asks you what you think about the annual guaranteed wage and your reply will be heard by all members of the group.

Much depends upon the attitude you assume in answering the question. For example, you could reply that an annual guaranteed wage is an "absurdity," is "impossible," or is just the pipe dream of radicals. If you were to give this sort of an answer, your listeners would assume that you not only are definitely opposed to the idea but that you are not interested in its objectives.

On the other hand you could reply that a guaranteed annual wage is being discussed at the present time because people all over the world are interested in a greater degree of security for the individual. You could point out that some persons are advocating a guaranteed income because they think it would produce the stability that is essential to greater security. Then you could add that while you are thoroughly in accord with anything that will contribute to stability of employment, you personally doubt whether a compulsory guaranteed income, imposed by law and applied too soon or too drastically, would achieve that purpose. You could even go into detail as to how such a law might retard the development of stable employment.

If you answered in this last-mentioned manner you would accomplish several desirable things. First, you would raise questions which would cause your listeners to think the thing out for themselves. Secondly, you would impress them with the fact that you are definitely interested in the problem of employment stability. Third, you would convince them that you are not automatically opposed to a proposal because of prejudice against "radical" ideas.

We believe it is important that every business man who may be considered as a spokesman of business be careful in expressing opinions on current political, economic and social issues. The manner of expressing the opinion is as important as the substance of the opinion.

A curt brush-off can do incalculable harm, whereas an intelligent reply—indicating a wholesome interest in the subject—may win converts to sane thinking and will create good will for industry.

FREEDOM AND CREDIT: Testifying before a House sub-committee concerned with the problems of "small business," Walter Siegerist, a St. Louis manufacturer, compared conditions in the depression with those of today in a way which will appeal to thousands of executives.

Mr. Siegerist points out that in spite of the unfavorable conditions existing in the early thirties, many small industrial companies managed to survive, even though they were forced to operate several years under heavy debt and without sorely needed capital. With this splendid record of survival in mind, asks Mr. Siegerist, why are small business men today so fearful of the future?

His answer is that in the thirties, industrial management had a large measure of freedom. It could plan, price, purchase and sell in a free market. Today management does not enjoy this freedom of action. It fears many of the present controls and restrictions will be continued after the war ends.

These controls hurt the financial standing of small business. Excessive taxes, arbitrarily-fixed prices, one-sided labor policies, tax collecting by employers, renegotiation uncertainties, excessive paper work for

(OVER)

government bureaus and continued extravagant government spending all combine to cause bankers to be concerned about the credit of small enterprises.

This is a powerful appeal for freedom for private enterprise in the postwar period. —p. 82

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ASSOCIATION ATTITUDE: Discussing "Trade Associations and the Antitrust Laws," Wendell Berge, assistant attorney general, made a remark to Washington Trade Association Executives which deserves the attention of everybody identified with industrial association work.

Mr. Berge declared that whether trade associations "shall in the long run contribute to the ultimate salvation of our business life or to its destruction depends to a large degree upon their fundamental attitude: Are they seeking to expand production and distribution at lower costs so that an ever increasing body of consumers can purchase a greater volume of goods at lower prices; or are they seeking to restrict production, regiment distribution, raise prices and corner the profits for that little group that is fortunate enough to belong to the club?"

To get the most out of this pronouncement, think primarily of its economic aspects and try to ignore any political or legal implications which may occur to you. —p. 84

• • •

SLOW START EXPECTED: At the present stage of reconversion it is prudent to take most estimates with a grain of salt. Even the most painstaking surveys produce figures which can be made meaningless by factors too uncertain or intangible to be predicted accurately.

For instance, WPB Chairman Krug estimates that of the 51,200,000 civilian workers, only 6,600,000 are in jobs likely to be affected by cutbacks. He has also given tentative figures on the amount of steel that will be available for civilian goods at stated intervals.

While these and other data may be the best obtainable at this time, they cannot provide a definite basis for planning or for action. Interlocking agency restrictions and shortages in manpower and materials still are too numerous and effective to permit clear-cut progress in reconversion now. But somewhere along the line, the missing pieces of the puzzle will fall into place and the zeal for reconversion will assert itself in a way that will make up for the seeming lack of progress to date. —p. 75

ACCENT ON REPAIRS: Ship repair work is becoming one of the most pressing problems of the war program. The Navy Department states that 30,000 men are needed for repairs (p. 79) on the West Coast alone. The Mare Island and Puget Sound Navy yards could use 9000 and 5000 more workers, respectively, and the Hunters Point dry docks are short 6000 men. . . . Private shipyards in the Pacific Northwest not only are booked to capacity on repairs (p. 97), but are expecting more work when merchant ships are transferred from Atlantic to Pacific duty. . . . In Baltimore, considerable ship reconversion work is in sight (p. 80) as well as a highly sustained volume of ship repair work for an indefinite period. . . . Speaking of repairs, unbelievably effective emergency jobs are being performed under battle-damage conditions in this war. The Navy has in service or on order 13,000 emergency oxyacetylene cutting outfits weighing only 56 pounds and contained in a fire-resistant canvas pack which can be carried by one man. Equipped with this outfit (p. 107) a man can crawl through narrow passages, cut through jammed compartment doors and cut away tangled steel wreckage. Gas capacity of one unit of cylinders will cut 225 lineal inches of 1-inch steel plate. . . . Several 440-foot Liberty ships have been converted by the Air Technical Service Command into floating B-29 repair shops. Anchored at strategic points in the Pacific (p. 98), they are performing "fourth echelon maintenance" or complete and heavy overhaul of aircraft accessories. . . . The War and Navy Departments are seeking to negotiate pre-termination agreements with steel companies to facilitate the rapid settlement of terminated war contracts. Of the 19 integrated steel companies involved in the present program, eight will be handled by Ordnance and six by the Corps of Engineers of the War Department (p. 85), while three will be handled by the Bureau of Ships and two by the Bureau of Ordnance of the Navy Department. . . . RFC is under strong pressure to make a decision affecting the Fontana steel plant. The agency can accept Mr. Kaiser's plan for refinancing the RFC loan, in which case he could retain title to the property for postwar operation (p. 78), or it can foreclose the loan and offer Fontana to the highest bidder.

•

E. L. Shaner

EDITOR-IN-CHIEF

How Ryerson Assures Alloy Steel Quality

Each alloy shipment is personally inspected and tagged as a part of a rigid quality control system, which we call the Ryerson Certified Steel Plan. This plan covers: selection of the individual heats of alloy steel, the testing of samples from each heat, the positive identification of every alloy bar with stamped heat symbol and painted color markings (or with metal tags), and a Ryerson Alloy Steel Report, which is sent with each shipment. This report shows complete test information for the particular heat of steel used in filling your order. It contains: chemical analysis, recommended working temperatures, the Jominy hardenability results, and an interpretation of physical properties for 1, 2, 3 and 4 inch rounds quenched and drawn at 1000°, 1100° and 1200° F. The report serves as positive identification, a check on quality and as a guide to satisfactory heat treatment.

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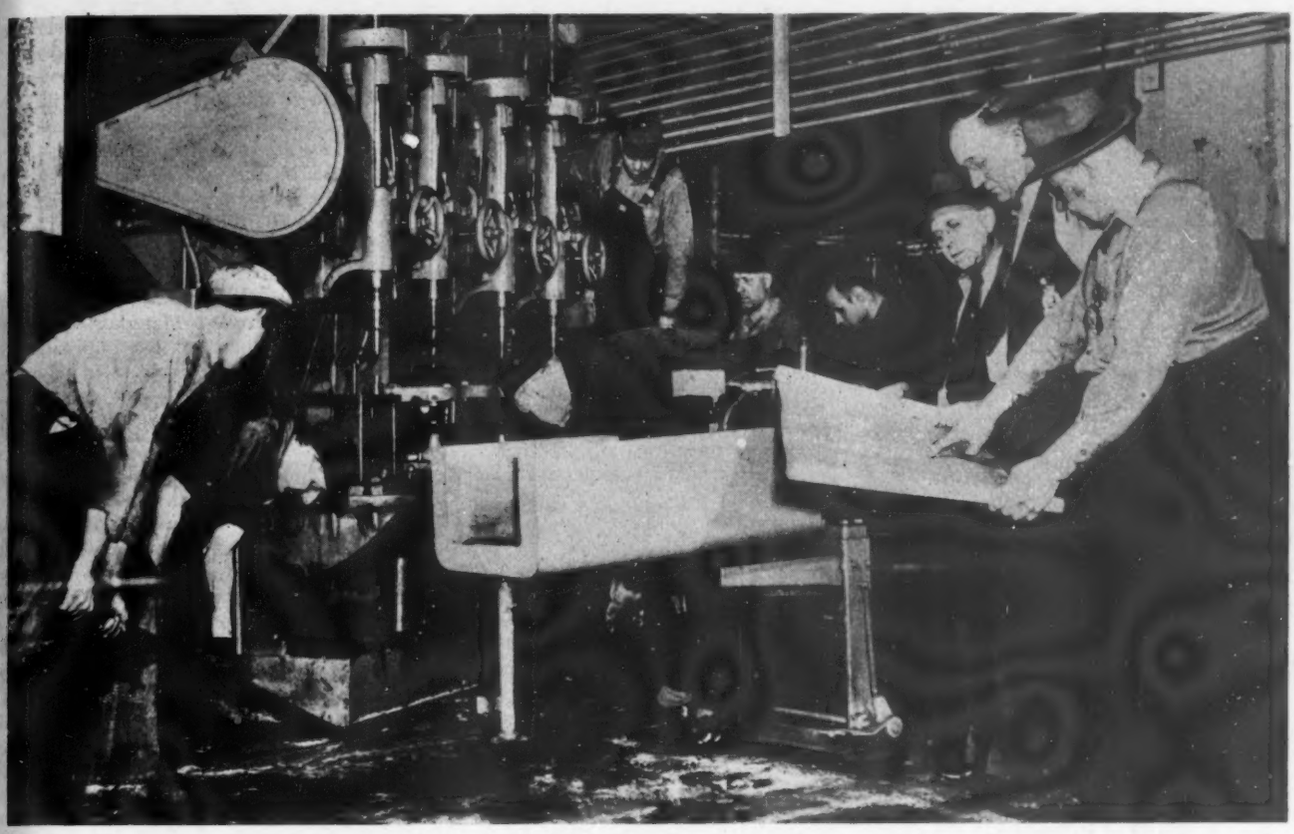


Blueprints made months ago by Hudson Motor Car Co. in anticipation of the go-ahead signal for reconversion are being used here to move a drill press to the spot where it is needed to help produce passenger automobiles. NEA photo

Transition to Civilian Output Slow

Scarcity of materials large obstacle in resumption of peacetime manufacture. Manpower, tools and continuing war agency restrictions also hinder, but durable goods output within year to exceed 1939 level by 30 per cent

METALWORKING companies, freed from war production obligations and seeking to resume the manufacture of civilian goods, are finding themselves in much the same position as the housewife with a handful of red points attempting to purchase a prime standing rib roast and a few choice steaks. The authority is there but the material is scarce.

Many of the War Production Board's limitation and conservation orders have been revoked or soon will be. Machinery has been set up to aid industries returning to civilian goods production obtain materials and machines. However, many of these materials and tools are in short supply. The military cutbacks have not affected the backlogs of steel companies, for example, in as pronounced a manner as was anticipated, and prospects for rolling much unrated tonnage in most products during the third quarter are not bright.

Tools for reconversion are short and for some months will continue to hinder the changeover.

Although WPB has been lifting its restrictive orders in wholesale fashion, manufacturers still are hampered by the restrictions of other war agencies. For example, War Manpower Commission regulations still in effect prevent the free flow of workers to areas and industries where jobs in civilian goods industries are or soon will be available.

The slowness in translating the potentials of materials, manpower and facilities no longer needed for a two-front war into civilian production is not unexpected. Partially it stems from uncertainty as to what the future military demands will be and a justified caution on the part of war procurement agencies against releasing too much capacity for peacetime output. Partially it is due to the interlocking controls of the various agencies and the natural cumbersomeness of bureaucratic organizations. Partially it is due to dislocations caused by the war; most of the materials, labor skills and facilities may be available to produce a civilian item, but a shortage in one or two critical components may delay the whole program.

Cutbacks in the military program have not yet appeared in the volume anticipated. Although the programs are being revised in accordance with plans of the war procurement agencies, these revisions are slow to be translated into cancellations. The mechanics of clearing cancellations through interested war agencies is an important retarding factor.

However, such cutbacks are increasing in volume. Significant is the reduction in the aircraft program of 17,000 planes over the next 18 months, the largest single armament slash since V-E Day. This may release 450,000 workers by the end of the year and will release considerable quantities of metals for civilian production. Aircraft production, which until recently was estimated running at about $20 billion annually, was cut down by $3.5 billion before V-E Day and the latest cut reduces the program by a similar amount. The Ford-operated Willow Run plant,

Representatives of the United Automobile Workers-CIO journey to Washington to confer with the President on the problem of unemployment among auto workers in the Detroit area. Pictured leaving the White House are: President R. J. Thomas, UAW; Frank Winn, a member of Thomas' staff; W. G. Grant, president of the Ford local; Matthew Hammond, another local president. NEA photo

originally scheduled to close Aug. 1, now will cease operations June 30.

War Production Board Chairman J. A. Krug promises sharp new cuts in the armament program over the coming weeks. He estimates the war machine will need 2,900,000 fewer workers three months from now and that in six months the number of persons engaged in war activities will have decreased by 4,800,000, including 1,000,000 discharged servicemen.

Mr. Krug is optimistic that much of the materials and manpower released by coming cutbacks will be quickly absorbed in an expanding civilian economy. Today the production of durable consumer goods for the civilian economy is at a rate slightly under $7 billion annually. A year from now, assuming that present estimates of war requirements hold, output of durable consumer goods for civilians should rise to $16.7 billion, or about 30 per cent more than was produced in 1939 (see accompanying chart).

A tremendous demand for these civilian goods is expected to spur maximum initiative and ingenuity on the part of manufacturers in producing the greatest possible amount of goods with the available materials and resources. WPB statistics indicate that in 1944, if goods had been available, people would have spent close to $120 billion whereas they actually spent only $98 billion. Likewise in 1942 and 1943, huge demands for civilian goods went unsatisfied. This pentup demand is the foundation on which WPB is banking for a strong transitional economy.

The major problems to be confronted in getting back into civilian production are the same problems confronted in reaching peak war production: Materials, manpower, tools and facilities, and government controls.

The munitions program for the eight months following V-E Day, according to current official plans, will run at an annual rate of $54 billion. This is two-thirds again as much as in 1942, almost equal to the amount in 1943, better than nine-tenths the rate in 1944 and equivalent to 90 per cent of total value of manufactured goods in 1937.

This makes the future war program appear very large. However, it must be remembered that the munitions production program is now mature and that it no longer is necessary to build gigantic new plants or convert old ones or to train vast numbers of new workers. The large volume of munitions production over the coming months can be accomplished more easily than was the case in former years. Fewer men and less material will be necessary and more men and materials can be released for civilian output.

According to WPB estimates, direct military requirements for carbon and alloy steel will drop from more than half of total production to about one-third by the fourth quarter of this year. Copper requirements will drop even more. In fact, the Controlled Materials Plan for brass mill products has been open-ended for unrated orders five weeks in advance of the July 1 date set for the general release of controlled materials on unrated orders.

More small electrical motors will become available soon, easing a critical problem for many civilian goods makers.

On the other hand, many materials will continue in extremely short supply. Textiles and leather will be tight. Gray iron castings will be short. Materials for containers will be scarce and producers of civilian items may be hard pressed to find containers in which to ship their products.

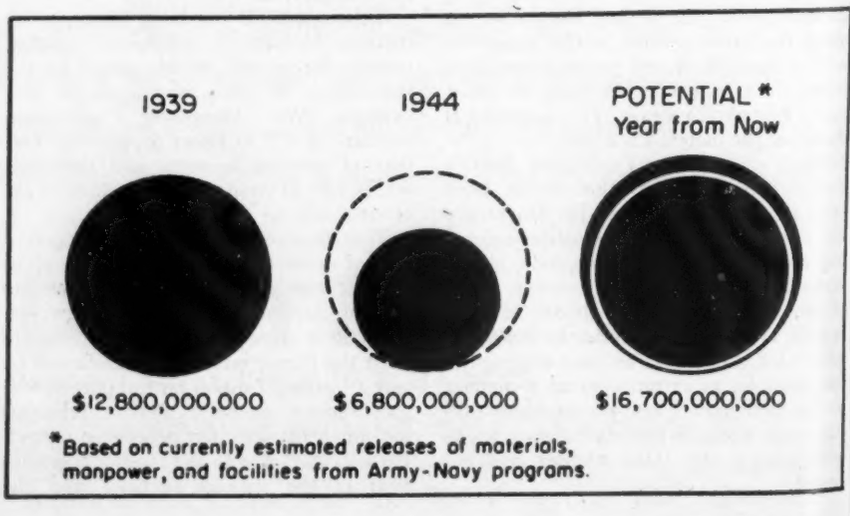
Even in materials in which critical shortages do not exist, a considerable period will be required to fill the pipelines for civilian production just as time was consumed in preparing for war.

Idle manpower already is appearing in the wake of military cutbacks and pocket unemployment is causing concern in union and some government circles. Here the problem as yet is not an overall excess of manpower, but idle workers in boom munitions centers, while other centers have manpower shortages. This problem is certain to be aggravated as the transition develops and will cause plenty of headaches.

However, the great majority of civilian workers will not be required to shift jobs during the reconversion period and the very process of reconversion will help in re-employing released workers. As munitions contracts are cut back in volume, a

(*Please turn to Page* 199)

DURABLE GOODS—PREWAR, 1944, YEAR FROM NOW



Reconversion to Civilian Goods Production Pushed in Dominion

Swing from war to peacetime production so far on small scale but many plants are expected to be in high gear on civilian products before end of the year. Auto reconversion in step with that in U. S.

WITH conversion of Canada's industry from war to peace activities as announced by C. D. Howe, Minister of Munitions and Supply, iron and steel buying in the Canadian markets is being more definitely tied to production of consumer goods.

While the swing from war to peace production schedules has been on a small scale up to this time, it is gradually expanding and the minister stated that many plants will be in high gear on civilian production before the end of this year.

While he could give no actual date as to when passenger car output would be under way, he stated that these cars will be rolling off the lines before the first snow falls in 1945 and plants will operate at peak production throughout 1946.

"The first automobile will be produced in Canada about the same day the first automobile is produced in the United States," said Mr. Howe. He continued that the conversion from war to peace was already 50 per cent completed in Canada and there are 5000 more unfilled jobs in Canada than one year ago.

Wysor To Supervise German Metallurgical Operations

The Allied Control Council announced in Paris last week that R. J. Wysor, who until recently was president, Republic Steel Corp., Cleveland, has been named to supervise metallurgical operations in Germany. German steel mills will be controlled, dismantled or moved and Mr. Wysor will serve among a group of leading American civilian and Army officers appointed to carry out United Nations' policies in controlling Germany's economy.

Dr. Calvin B. Hoover, dean of Duke University Graduate School, has been named head of the intelligence group for the council. He will also serve as special advisor to Brig. Gen. William H. Draper, chief of the Economic Division. Other experts named are: Edward S. Zdunek, formerly head of General Motors at Antwerp, Belgium, to supervise the Engineering Section; Philip Gaethke, formerly of Anaconda Copper Mining Co., will direct all mining operations in the United States occupation zone; Philip P. Clover of Socony Vacuum Oil Co. will be chief of Oil Section; Dr. W. O. Snelling, Allentown, Pa., consulting chemical engineer; Laird Bell, chief counsel for the Economic Division; Lloyd Steers, special advisor on food and agriculture; Col. James Boyd, chief of a branch to control industrial production; Peter Hoglund to serve as Col. Boyd's deputy, and Col. Maurice R. Scharff to head the Requirements and Allocations Branch and to pass on raw materials and components permitted the Germans.

Nonintegrated Producers Press for Price Relief

Nonintegrated steel producers plan to intensify their efforts to obtain relief from the steel price schedules set up by the Office of Price Administration May 23. At a meeting last week the Committee of Nonintegrated Producers reaffirmed its view that the increases allowed the steel industry by OPA were inadequate to meet the losses now burdening the industry, especially the smaller companies.

The committee plans to prepare a brief to submit to the Senate Committee on Banking and Currency seeking amending of the price control law so that OPA would be required to consider all cost factors in determining the extent of price relief granted an industry.

Membership of the committee has been enlarged and now consists of: Lauson Stone, president, Follansbee Steel Corp., Pittsburgh; Robert W. Wolcott, president, Lukens Steel Co., Coatesville, Pa.; R. K. Clifford, vice president, Continental Steel Corp., Kokomo, Ind.; David Thomson, president, Phoenix Iron Co., Phoenixville, Pa.; E. L. Parker, president, Columbia Steel & Shafting Co., Carnegie, Pa.; John Hosack, vice president, Mahoning Valley Steel Co., Niles, O.; D. V. Sawhill, president, Mercer Tube & Mfg. Co., Sharon, Pa.; and J. D. Streett, assistant to president, Granite City Steel Co., Granite City, Ill.

Present, Past and Pending

■ FORD MOTOR TO BUILD ATLANTA ASSEMBLY PLANT

DEARBORN, MICH.—Ford Motor Co. has purchased an 82-acre site near Atlanta, Ga., to be used for a postwar assembly plant and parts depot.

■ STEEL WAREHOUSE STOCK REPLACEMENT PLAN SET UP

WASHINGTON—A new plan to enable steel warehouses to replace their stocks will become effective July 1, through issuance of direction 3 to order M-21, WPB has announced. It establishes seven groups of products under which warehouses must collect CMP allotments for the purpose of ordering stock replacements, if they wish to order on an authorized controlled materials order basis.

■ STRIKES HIT RECORD IN 1944; LOST TIME LOWER

WASHINGTON—There were 4956 strikes and walkouts in 1944, involving about 2,116,000 workers, Bureau of Labor Statistics reports. Stoppages were most extensive in the automotive industry, iron and steel and mining. While the number of work stoppages established a new high, lost time was lowest on record.

■ HIGH PRIORITY GIVEN DRAINAGE EQUIPMENT FOR HOLLAND

WASHINGTON—WPB has assigned high priorities to $5 million worth of equipment needed for draining large areas in Holland. Some of this equipment will be used by the Allied military forces, some purchased for cash by the Dutch, and some provided by the United States as lend-lease.

■ GENERAL KNUDSEN RESIGNS ARMY POST

WASHINGTON—Lieut. Gen. William S. Knudsen has resigned his Army post as of June 1. For the past five years he has been one of the foremost figures in the organization and development of the war production program.

■ BRETTON WOODS SUPPORTERS PREPARE INDUSTRY REPORTS

WASHINGTON—Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt., has announced, as chairman of the nationwide committee of businessmen to support the Bretton Woods agreement, preparation of a series of reports on various industries, one of which covers the machine tool industry.

■ GENERAL MOTORS TO BUILD 90,000 CARS IN 4TH QUARTER

WILMINGTON, DEL.—General Motors Corp. does not plan a $500 automobile, Alfred P. Sloan Jr., chairman, said last Thursday. The corporation will build 90,000 passenger cars in fourth quarter of 1945.

Urge Early Action on Fontana Mill

Federal government pressed for prompt ruling on terms for postwar operation of war-born works

RAPID approach of conversion from war to peace has brought a flurry of activity in far western political and other quarters to force early federal government action on terms for postwar operation of Henry J. Kaiser's steel mill at Fontana, Calif.

During the last few days these developments have occurred, in rapid-fire order:

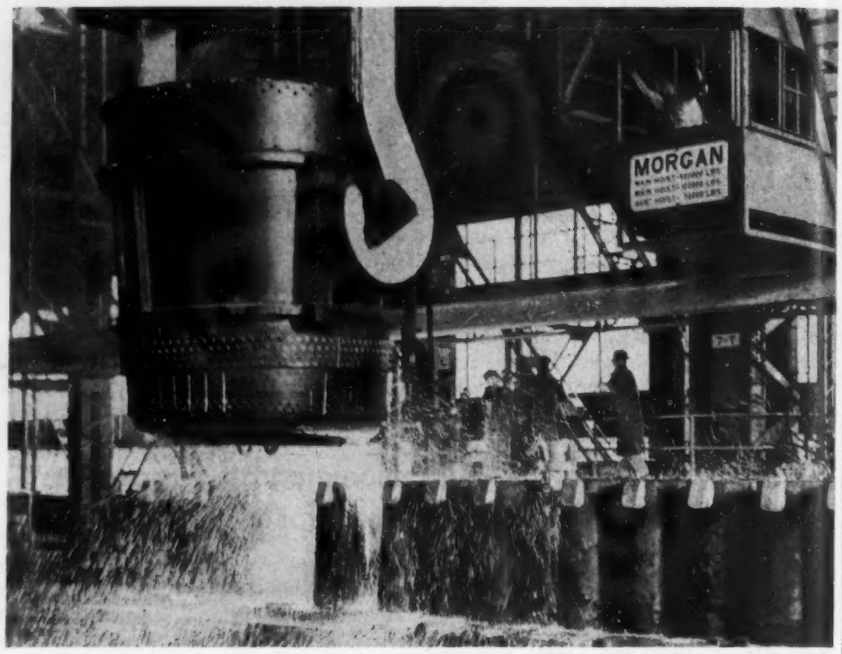
1. The California congressional delegation has urged the federal loan administrator to act immediately in arranging financing terms with Mr. Kaiser.

2. The Senate and Assembly of the California legislature have passed a joint resolution calling on the federal government to provide for the "prompt reconversion" of the Fontana steel mill to peacetime uses.

3. Governor Earl Warren of California made a similar request in a formal public statement.

4. Mr. Kaiser disclosed that conversion of the war-born plant to peacetime uses would require an additional investment of $52 million. These funds would be spent to provide facilities for making tin plate, light sheets, a pipe mill and certain other improvements necessary to reduce costs of operation.

5. The Bank of America announced it is ready and willing to join with other far western banks to provide $60 million, with RFC underwriting, in order that working capital for peacetime conversion of Fontana can be undertaken.



Henry Kaiser's steel mill at Fontana, Calif., is the subject of much speculation with respect to postwar operation. Above is shown molten steel being poured by the ladle crane operator at the plant, which was the first integrated steel mill west of the Rocky Mountains. Construction of the works was partly financed with an RFC loan. NEA photo

Depends on RFC's Decision

Crux of Fontana's immediate future is the RFC's decision on refinancing or disposing of the plant. There are two alternatives: Mr. Kaiser's plan for refinancing the RFC loan could be accepted and Mr. Kaiser would retain title for postwar operation. Or, secondly, the loan could be foreclosed and the mill taken over by the RFC which then could offer it to the highest bidder as surplus property.

To establish the plant as a going concern, the RFC loaned Mr. Kaiser $111 million, of which approximately $95,500,000 was spent for actual construction and the remainder for contributing facilities and supplies. Of the total loan, Mr. Kaiser has repaid about $27 million on principal and has paid interest of about $8,600,000. These funds were derived from earnings of the Kaiser shipyards. By the time the shipbuilding program is completed, Mr. Kaiser expects to amortize $40 million of the loan, leaving unpaid principal of $71 million.

What plans have been offered to the RFC for refinancing this loan have never been disclosed by Mr. Kaiser. The proposed loan of $60 million by the Bank of America, and others, would be only for postwar improvements to the plant. The amount necessary to refinance the original RFC loan would have to be an additional operation, unless an arrangement is made with the RFC to refinance on the basis of amortizing the loan out of future earnings.

Possibly one reason behind the recent concentrated campaign to bring quick RFC action on the matter is unofficial reports that order backlog of the Fontana mill for the third quarter this year has dwindled sharply and the mill may have to close partially or fully within the next few months. This is said to be only a temporary situation, however, as there are indications of increased orders for later months of this year.

The statements of proposed action voted by both the California congressional delegation and the California legislature follow a similar pattern. The appeal is made on the basis that the Fontana mills' continued operation is necessary to provide the Far West with an industrial foundation and as a bulwark against postwar unemployment. The resolutions also decry any action which would put Fontana in the hands of eastern interests.

In its statement, the congressional delegation said:

"The steel plant at Fontana will be of major importance in helping to create jobs. Already enormous cutbacks are taking place in industry. The people of California need to know at once that we are going to have a steel plant of our own that will allow the planning of new industries.

"Time is most important for the purpose of providing the employment not only at Fontana but in its related industries at a time, now here, when it will be needed. Further, there would be the extreme hazard of Fontana falling into the hands of interests that would not serve the objectives which we, in the West, are seeking.

"We are not urging that any action on Fontana be taken to the exclusion or detriment of any of the government's best interest in the Geneva steel plant or any other private or government-owned steel facility. We do recognize, however, that the problems of Geneva are many and particularly that its ultimate use will depend on drastic reduction of existing freight rates. This, we realize, may take months to accomplish. Therefore, we feel that any action on Fontana should be handled separately and without relation to what must ultimately be done to the Geneva plant. Action on Fontana is required now.

"We understand that Kaiser Co. has

presented a suggested plan for the construction of additional facilities at Fontana together with a plan for financing. This objective for Fontana is in keeping with ours, namely, to keep Fontana in the hands of the present operators, to provide the West with additional steel products at prices that will be less than the so-called differential, and thereby be of benefit to the West. We appreciate that an ultimate alternative to working out an equitable financing arrangement with the present operators would be possible foreclosure by the RFC and sale or other disposition of the Fontana property to some established steel company. The time alone involved in such procedure would require many months during which the facilities would be entirely idle. No constructive good would be served, and it would be a definite loss to the West."

Legislature Makes Appeal

The California legislature's resolution covers five basic points as follows:

"1—That the prompt conversion of the Fontana steel plant to uses which will serve the peacetime industrial needs of California and the western states is vital to the effort to achieve orderly postwar adjustment and full employment.

"2—That agencies and officers of the Federal government concerned with policies affecting this plant be urged to give early and thorough consideration, in such policies, to those which would create for this plant a normal and permanent status in our economy.

"3—That full consideration be given by such agencies and officers to insuring the operation of this plant under reasonable competitive conditions and under management policies which will give adequate consideration of the needs of western industrial development.

"4—That in the reconversion of this, as well as other western war industries, the fullest consideration be given to programs which contemplate the continued operation of these plants by those who pioneered them, not only as a recognition of what they have done to balance our economy, but also as additional assurance to the people in interdependent enterprises that a determined effort will be made here in peacetime to perpetuate and expand the opportunities which they have created.

"5—That the federal government act immediately on a conversion policy for the Fontana plant and other basic western industries."

Up to now all indications have been that the RFC considers Geneva a more important matter than Fontana, possibly because Geneva which cost twice as much as Fontana is wholly owned by the government. It has been operated throughout the war by United States Steel Corp. U. S. Steel, Colorado Fuel & Iron Corp. and Mr. Kaiser have signified their intentions of bidding for Geneva. U. S. Steel also has stated it may seek to buy the Fontana plant.

Prize-winning Technical Papers Read at Blast Furnace Meeting

Chicago district group hears discussions on gas flow and coke consumption, furnace repairs, use of lumnite cement and setting of stack drafts. H. V. Lauer elected president of association. Other officers named

FOUR papers which won awards in its fourth annual technical papers contest were read in abstract at the third regular 1944-45 meeting of the Blast Furnace and Coke Association of the Chicago District held recently at Hotel Del Prado.

The competition is sponsored for the benefit of the younger members and men employed by industries represented in the association, with cash awards of $100 for first prize and $50 for second prize in the blast furnace and coke plant divisions, respectively.

"Observations on Gas Flow and Coke Consumption in the Blast Furnace" was the title of the paper which won for Kurt Neustaetter, blast furnace practiceman, Inland Steel Co., East Chicago, Ind., the first prize in the blast furnace division. In his contribution, the author reported a lengthy series of observations taken to determine the cause of repeated furnace kicking. These kicks occurred in months of poorest coke consumption. Remedy appears to rest in using more coke, thereby raising top temperature, and to regulate stack charging to improve gas flow.

Describes Time-Saving Repairs

Robert V. Huffman, superintendent's clerk, Blast Furnace Department, Youngstown Sheet & Tube Co., East Chicago, Ind., won second place in the blast furnace division with a paper "Unusual Repairs to Blast Furnace Stove." In this contribution, the author described how a stove badly deteriorated internally was repaired in a unique manner at a considerable saving in time and labor.

The procedure involved making two side holes through which the bottom was cleaned out, the checker work supported by timbers suspended on cables dropped from the top, subsequent shoring up the checker work with heavy timbers, then rebuilding the arches. Job was done in such a manner from the outside that no worker entered the stove until all hazard of falling masonry had been eliminated.

Taking first prize in the coke plant division was a paper "Developments in the Use of Lumnite Cement at Gary Works," by James E. Ludberg, patcher foreman, Coke Division, Carnegie-Illinois Steel Corp., Gary, Ind. The author described chiefly the making of monolithic linings for cast iron and fabricated steel coke oven doors which have lasted as long as nine years, but also included miscellaneous applications of the material for general patching around inspection holes, lining ascension pipes, and casting special shapes.

J. R. Purdy, general turn foreman, Colorado Fuel & Iron Corp., Pueblo, Colo., was author of second prize paper in the coke plant division, its title being "Setting of Stack Drafts on Combination Cross-Regenerator Ovens." The procedure Mr. Purdy outlined is used on Koppers-Becker ovens underfired with coke oven gas. He pointed out that adjusting the butterfly valve on one regenerator affects the draft on the other regenerators in the series, making equalization difficult and time consuming. However, when four direct-reading draft-recording instruments are employed, three men can set the drafts on a whole battery in 2 hours.

H. V. Lauer, assistant division superintendent, coke plants, Carnegie-Illinois Steel Corp., Gary, Ind., was elected president of the association to succeed T. F. Plimpton, superintendent of blast furnaces, Inland Steel Co., Indiana Harbor, Ind. Mr. Lauer has been serving as vice president. Secretary-Treasurer C. M. Horan, assistant superintendent of blast furnaces, Youngstown Sheet & Tube Co., East Chicago, Ind., was advanced to vice president, and Walter Deveney, general superintendent, Crawford Station plant, Peoples Gas, Light & Coke Co., Chicago, was named secretary-treasurer.

Navy Ship Repair Labor Shortage Acute on Coast

Urgent need for 30,000 skilled, semi-skilled and unskilled workers for (naval) ship repair work on the Pacific Coast was broadcast last week by the Navy Department. Without revealing definite figures as to the amount of repair work to be done, Navy officials stated some $300 million in new ship construction had been transferred to East Coast yards to release West Coast facilities for repair work.

Workers are reported quitting their shops in Pacific repair yards in the face of the existing manpower shortage and increasing work load. It is pointed out the Mare Island (Calif.) Navy yard lost 600 net workers last month and is some 9000 workers short. Puget Sound (Wash.) Navy yard is some 5000 short and lost 600 net last month. Hunters Point (Calif.) Naval dry docks is short 6000 workers and lost 700 net last month. The situation in private yards is described as comparable.

District's War Production Pace Little Changed

Few plants in industrial area yet hit by important military cutbacks. Peak operations limited only by labor shortage

WAR industries in the Baltimore area continue to absorb steel at a high rate. In fact, war work in the district continues at a peak limited only by a shortage of labor. So far there have been relatively few cancellations and where they have developed they have led to a comparatively small cutback in each case from both the standpoint of steel required and the amount of labor relieved.

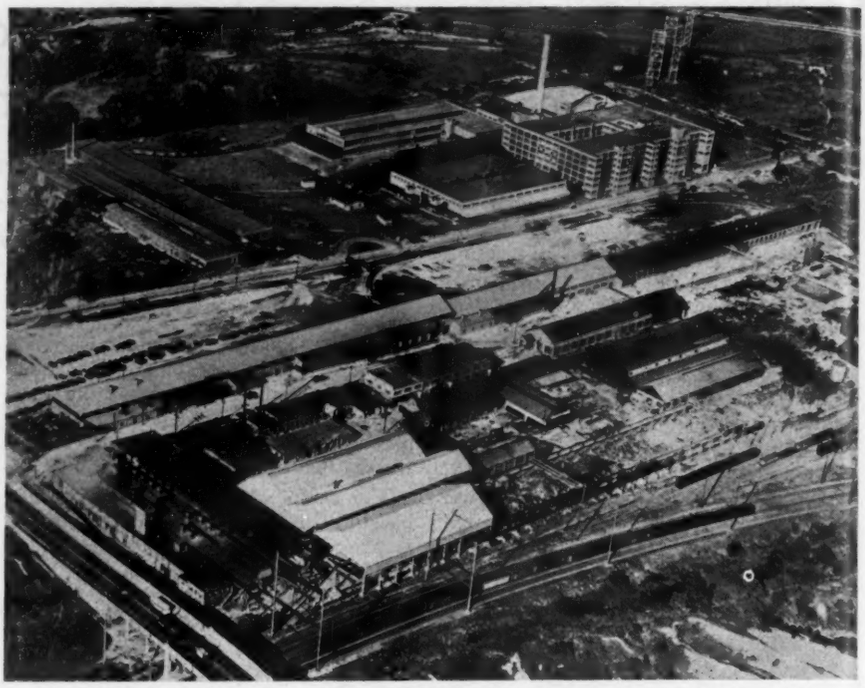
For instance, one company has had a cutback in caps for 105 mm. shells, and while the company is now planning to lay off 45 per cent of its workers, this percentage will involve less than 100 persons. Another similar case may be cited in the recent cancellation of an order for gun shields and still another in a cutback now in prospect at one plant in shell casings. This latter cutback is likely to develop this month and at most will not result in the laying off of more than 75 employes. As indicated, the steel and metal cancellations in these instances will involve relatively small tonnages.

It is believed at present there will be few really important cutbacks in either steel or labor until ship or aircraft work begins to slump. The prospect as to shipbuilding is that there will be no important curtailment in operations before late October. At that time work at the Bethlehem-Fairfield yards may begin to taper sharply with the program there winding up around the end of the year, according to present indications. However, there is still considerable ship reconversion work in sight, to say nothing of a highly sustained rate of ship repair work for an indefinite period.

No Cutbacks at Aircraft Plants

As for aircraft work, the two aircraft companies in this district are both engaged on Navy work and so far there have been no cutbacks nor are any reported under early contemplation.

Incidentally, it is reliably stated, 85 per cent of the war work in the Baltimore industrial area is comprised of shipbuilding, aircraft, steel production, communications and chemicals. It is estimated about 240,000 employes are engaged in the area's war industries. This compares with a peak of approximately 250,000 some time ago, the decline being accounted for by the migration of various workers back to their homes outside the district, and not by any slackening in demand. In fact, the largest steel producer in this area alone could use at least an additional 5000 or 6000 men.



Works of the Rustless Iron & Steel Corp., one of the leading producers in the Baltimore area, as seen from the air. Company produces stainless steel semi-finished, bars, rod and wire. NEA photo

While the most important cutbacks in steel and labor will occur when shipbuilding and aircraft work start declining, curtailments sooner or later in certain other lines of war activity will be felt, and possibly within the next 30 to 60 days, for it is admitted that Army cancellations to date have not as yet been on anything like the scale that was at one time anticipated, once the war in Europe was over. This is ascribed in part to the fact military officials still do not know how much equipment in Europe can be salvaged in meeting the Far Eastern requirements and also to the fact that these later requirements cannot at the moment be definitely gaged.

One program especially active in this district, along with shipbuilding and aircraft, is the rocket program, with important prime contracts being handled here along with numerous subcontracts. Communications industries also continue particularly active; also manufacturers of miscellaneous types of small machinery equipment.

Canning season is fast approaching, with labor a bottleneck. Two district canmakers for the first time are now employing prisoner of war labor in their fabricating operations. War prisoners have been used here before in the picking and canning of crops and are still being used, but a shortage of help still prevails. General line can manufacturers are especially hard hit for the reason that they have secondary labor ratings.

Locally, building construction is confined to small miscellaneous projects, which in the aggregate amount to a fair tonnage. Much of it is of a rush character, with the result that warehouses are having difficulty in keeping their stocks of structurals in balance. Incidentally, distributors report continued brisk business in general, although not quite up to last month's rate.

The largest structural job figured here recently by fabricators involved 1640 tons for the Aquia river bridge of the Richmond, Fredericksburg & Potomac railroad, just placed with the American Bridge Co. Bids are being asked on 300 tons for the remodeling of the roof of a large shop at the Glenn L. Martin Co.; also pending are 250 tons for a naval ordnance laboratory at White Oak, Md., bids having been opened June 1.

An eastern Pennsylvania shape mill has received an order for 14,000 tons for shipment under lend-lease to Europe for rehabilitation purposes.

An outstanding reinforcing bar award involved 830 tons for the George Washington Hospital addition. Washington, placed through C. H. Tompkins, that city, with Bethlehem Steel Co. The Tompkins company also is inquiring for 275 tons for the Cherryville Hill housing project in the Washington area.

Alloy Steel Output in April Shows Decline

Alloy steel production in April totaled 918,378 net tons, compared with 992,143 tons in March, according to the

American Iron and Steel Institute. For four months alloy output aggregated 3,680,939 tons. The April total was made up of 595,695 tons of open-hearth ingots and 322,683 tons of electric furnace ingots. Hot-topped carbon ingots in April totaled 1,415,930 tons from open hearths and 10,034 tons from electric furnaces. Hot-topped ingots in March totaled 1,479,123 tons.

Alloy steels considered in this report include stainless and any other steel containing one or more of the following elements in the designated amounts: Manganese over 1.65 per cent, silicon over 0.60 per cent and copper over 0.60 per cent; also steels containing the following elements in any amount specified or known to have been added to obtain a desired alloying effect: Aluminum, chromium, cobalt, columbium, molybdenum, nickel, titanium, tungsten, vanadium, zirconium and other alloying elements.

Steelworkers To Seek 20 Per Cent Basic Wage Boost

Executive board of the United Steelworkers of America (CIO) last week called for immediate revision of the national wage policy to permit an increase in basic wage rates of at least 20 per cent.

In a resolution the board said the immediate future of the steel industry promises continued cutbacks and cancellations, and even if reconversion were to proceed with speed there would still be involved a serious cut in weekly wages for steelworkers due to the discontinuance of the 48-hour work-week.

Steel Company Distributes Increase in Vacation Pay

May payrolls of Allegheny Ludlum Steel Corp., Brackenridge, Pa., were swelled by $175,000, representing a retroactive increase in 1944 vacation pay.

Nearly $127,000 of this total was distributed at the Brackenridge and West Leechburg, Pa., plants of the company. The rest went to eligible wage earners at the corporation's plants in Buffalo, Dunkirk, and Watervliet, N. Y.; Wallingford, Conn.; Ferndale, Mich.; and Los Angeles.

The company is seeking to provide a similar adjustment for employes not covered in WLB's directive of Nov. 25, 1944.

AWARDS . . .

Award of the Army-Navy "E" has been made to the following:

American Welding & Mfg. Co., Warren, O.

Ford Motor Co., Willow Run Bomber Plant, Ypsilanti, Mich.

Waldes Koh-I-Noor Inc., Long Island City, N. Y.

Ward Machine Co., Brockton, Mass.

April Munitions Output Off but Only 1 Per cent Behind Schedule

REDUCED munitions production schedules in April were not quite met, but in most cases the misses were negligible, J. A. Krug, chairman, War Production Board, reported last week. Munitions output during the month was 1 per cent behind schedule. In no major group except combat and motor vehicles was the deficit more than 2 per cent. Actual production for the month was 4 per cent below that of March.

Military requirements began to drop off before V-E Day and the decline has accelerated since the surrender of the German forces. Current military programs, as revised through May 12, call for May munitions output 1 per cent less than for April and a gradual decline thereafter to a fourth quarter level 13 per cent below April and still lower levels in 1946.

Cutbacks have slashed some $7 billion from the peak munitions program for 1945, to a current total of $55 billion and corresponding cuts have been made in the 1946 program. This is a substantial drop, but it still does not bring programs down to a true one-front war basis.

The deficit in aircraft reflected a 10 per cent miss in aircraft engines. The planes themselves were above schedule, and the critical classification was withdrawn from six engine and plane models. Except for the C-54 transport and the F4U-4 Corsair, the only items still classed as critical are jet engines and a few new planes which have not yet reached volume production.

The poor showing in combat and motor vehicles was largely the result of strikes in component plants.

Cutbacks are not spread evenly over the munitions groups. Based on the latest available figures, guns and fire control are to slide off 40 per cent from April to the end of the year, and ships 34 per cent. In contrast, dollar value of aircraft and aircraft engine production is to decline less than 1 per cent and ammunition, by the fourth quarter, would actually be running 12 per cent above the April rate, with gains in such items as rockets, bombs, naval ammunition, and mortar shells.

In the case of carbon and alloy steel, it is indicated direct military requirements will drop from more than half of total shipments last year to little more than a third of an only slightly diminished supply by the fourth quarter of this year. In copper and copper base alloy products, the cut in military requirements is slightly greater. Thus, some steel and copper as well as increased quantities of aluminum will be released.

MUNITIONS PRODUCTION—April

(Preliminary)

	March Actual	April Actual	April Schedules	% Above or Below March Actual	% Above or Below April Schedule
	——Millions of Dollars——				
Aircraft	1,315	1,224	1,249	— 7	—2
Ships (Incl. Maintenance and Repair)	823	789	797	— 4	—2
Guns and Fire Control	270	265	267	— 2	—1
Ammunition and Bombs	702	695	690	— 1	+1
Combat and Motor Vehicles	505	450	473	—11	—5
Communications and Electronic Equipment	333	351	348	+ 5	+1
Other Equipment and Supplies	1,045	1,038	1,048	— 1	—1
TOTAL MUNITIONS	4,993	4,812	4,872	— 4	—1

April Pig Iron Output Falls Below March Record

PIG IRON production in April totaled 4,785,659 net tons, as reported by the American Iron and Steel Institute, compared with 5,227,790 tons in March. Blast furnaces in April operated at 86.4 per cent of capacity, compared with 91.4 per cent in March. The March output was second highest in history.

April production included 73,312 tons of ferromanganese and spiegeleisen, compared with 65,894 tons in March. Total for four months this year is 19,521,211 tons, compared with 21,082,127 tons in the comparable period in 1944. In 1943 cumulative output for four months was 20,326,130 tons. Comparisons by districts are presented in the following tabulation, in net tons:

	Pig iron	Ferro, Spiegel	Total April	Total Year to Date	Per Cent Capacity
Eastern	875,473	34,340	909,813	3,510,600	85.1
Pittsburgh-Youngstown	1,879,430	21,951	1,901,381	7,826,089	89.2
Cleveland-Detroit	505,356	.....	505,356	1,992,502	93.2
Chicago	1,043,652	.....	1,043,652	4,213,031	90.1
Southern	245,698	17,021	262,719	1,321,468	64.8
Western	162,738	.....	162,738	657,521	69.7
Total	4,712,347	73,312	4,785,659	19,521,211	86.4

Restoration of Freedom Is Held Needed To Remove Business' Fears

Spokesman for small business points out to House committee factors contributing to future uncertainties. Cites restrictive laws and directives which hamper normal functioning of private enterprises

By WALTER SIEGERIST*

ON EVERY hand there seems to be a fear that small business is or will soon be in financial difficulties. I have examined the standing of our customers, who for the most part are all small business houses. A study with Dun & Bradstreet reveals that small business continues to have excellent ratings and is enjoying satisfactory banking connections.

Let us go back to 1932, to 1936. I started with my company in 1932. Small business was then really in a bad way financially and getting worse. Some could get RFC loans, a very few had bank credits, but many were told, as I was, by the bank that we owed so much already and since the mortgage bonds were in default, it would be necessary for me to liquidate the business unless I could operate it without capital. We did operate without capital during 1933 and 1934. Matters were finally cleared up so the banks would again lend us money and the bonds were paid off with earnings. I helped several other small businesses similarly situated in this city to survive even though they had been without credit standing for three years or more.

Freedom Sustained Business in Thirties

Why then do we fear for the future today when we all have going concerns with cash balances, and the best civilian customers in the world waiting for our goods? The answer is that in the thirties, management had its freedom. We could plan, price, purchase, and sell in a free market. We bargained collectively and directly with our own employes. Our bank connections knew that our cash flow sheet of material, labor, inventory, administrative, tax, and other costs could be relied upon because no government bureau had the power to upset us. That is why the small business man survived the early dark thirties. He had freedom to use his knowledge, courage, and initiative.

Today we do not have freedom because our economy is necessarily planned to fit our war needs. This is as it should be. But what about small business' freedom sixty days after V-E Day? What about it sixty days after Pacific victory? We fear from what we hear that we will not have freedom returned to us so we worry. The statements from some parts of government that the regulations and restrictions now imposed are needed for economic planning for the greatest good for the whole people is most fearsome of all. We know that planning by government cannot be done without dictation of the kind our soldiers are fighting against on European and Asiatic battlefields.

I wish to mention some of the laws and directives that hurt our financial standing and cause our bankers to be concerned whether or not we are a good risk after V-E Day.

1. Taxation. All prudent business that is inclined to build up a reserve for reconversion can do very little because of the confiscatory excess profits taxes. These lead to many other indirect detrimental results or practices. It is a very inconsistent tax situation which makes the net cost of my $1 luncheon, when paid by my company actually cost the company 20 cents, but for which I am required to earn $1.50 to be able to pay for it because my government wants one-third of what I am paid by my company.

Excessive taxes on profits are in reality indirect sales taxes paid by the customers of the efficient producers.

Small and large business must do forward planning. This requires assurance from Congress that tax and similar business legislation will fall within a consistent pattern that may be depended upon. Tax laws must no longer be written by the squeal test method.

2. Prices. Small business knows that

STUDY ARMOR ROLLING: Steel company engineers and Ordnance representatives are shown above at Aberdeen Proving Ground, Md., where they met recently to discuss problems relating to rolled armor. Front row, left to right: C. Chase, Republic Steel Corp.; C. L. Altenburger, Great Lakes Steel Corp.; H. V. Joyce of Carnegie-Illinois Steel Corp.; W. P. Getty, Jones & Laughlin Steel Corp.; N. E. Rothenthaler, Ford Motor Co.; Robert Sibley, Henry Disston & Sons; Harry Dittmar, Republic Steel Corp. Second row: Lieut. Col. N. A. Matthews, Watertown Arsenal; H. J. Rouse, Aberdeen Proving Ground; Maj. D. C. Pippel, Office of Chief of Ordnance; Dr. C. H. Lorig, Battelle Memorial Institute; J. E. Shoemaker, Standard Steel Spring Co.; Maj. C. J. Yaeger, Aberdeen Proving Ground. Third row: I. W. Teichman, G. H. Oshry, Dr. E. L. Reed, Capt. E. R. Beyer, Lieut. A. P. Stergion and Lieut. F. S. Wolff, all from Aberdeen, except Dr. Reed, who represented Watertown Arsenal

*This is an abstract of a statement presented at a public hearing in St. Louis of a sub-committee of the House Select Committee to Investigate and Study Small Business. The author is president of the Associated Industries of Missouri, and is president and treasurer of The Medart Co., St. Louis.

the customers pay the expenses of the business. Furthermore, we realize that the other fellow's employes as well as our own are our customers. However, we cannot stay in business on the principle of OPA, that no business house may adjust prices of the loss items to cover costs as long as the company's business as a whole shows a profit. The OPA in any form would eventually be the death of small business. It is based on the premise that a government agency has better judgment than management regarding the item of cost entering into the products of business. Government lives off the profit of all private enterprise. Therefore, it behooves government to let private enterprise make a profit in order that government itself may live. The alternative is planned economy or Naziism with its slave labor.

3. Labor. Small industry employs the greater portion of the 25 per cent of the 60 million employed in industry. We want labor to enjoy the highest standard of living. It is American and good business. We however, ask that the employer shall have equal rights with labor and that the right of trial by jury shall be restored to the employer. There is nothing incongruous in the relationship of master and servant or employer and employed. It must be maintained in order to preserve our United States.
4. Tax Collection. A small business wants and must have pleasant relations with its employes. Anything tending against this should be eliminated. We are now the government's income tax collector. This is an added expense to business and an irritation to the employe that is blamed on the employer. The government should be its own tax collector.
5. Renegotiation. King George and his parliament "in their opinion" felt the American colonies should be taxed. We did not have the same opinion so we are the United States. In the year 1942, Congress passed the Renegotiation act which states, "If in the opinion" of certain secretaries and bureaus, a small business has made too much profit when selling its regular product at OPA prices or lower to these agencies and bureaus, then the business shall be penalized by forfeiting whatever portion of the profit the individual or bureau's opinion calls for. If no profit is made there is no renegotiation regardless of how high the price. This is the first time in the history of the United States that business efficiency is penalized and a profit deriving from good management and ingenious processing becomes a crime. The administration of this act permits bureau administrators to determine what in their opinion is a fair profit before taxes. Since there is no law or rule defining a fair percentage of profit, the Renegotiation bureaus make one determination one day, another the next in accordance with their personal feelings. Small business confidence will be hurt if there is an extension of this law.
6. Government Reports. The numerous and in some instances duplication of reports is an onerous, expensive burden on small business. In our business, one-third of the executive's time goes to government reports. This is a burden that cannot and certainly will not be borne by our peacetime customers. Take one example, our small business never paid more than $750 for a year-end audit before the war period. The 1944 costs for the audit plus federal and state income tax, report on pension operation, Budget Form 49-R-173, and standard form of contractor's report for renegotiation for 1944 made by the same auditing firm cost $1890, two and one-half times prewar cost. This is only one item demonstrating the high cost of government in our business.
7. Government Spending. The small business man has shown his patriotism by the wonderful job he has done. We all know war is terribly destructive. The objectives must be reached at any cost. However, we also have all spent our business lives in making the customer's dollar cover all items of expense or cost with a little left over for stockholders and for setting aside for the rainy day that always comes. We ask your committee and all of Congress to cut down government spending to the absolute minimum at the earliest moment consistent with victory.
8. Conclusion. I was an employe in many places for many more years than I have been an employer in a small business. It is my conviction that both management and labor and the country as a whole will remain free only so long as all elements of our economy remain free. It is for this reason that I say, for the sake of the freedom of the people, government must:

A. Give freedom back to large and small business.
B. Get out of all business itself as quickly as victory is proclaimed.
C. Stick strictly to its business of governing.
D. Test each large or small expenditure exactly as the small businessman must test it. If it cannot be afforded, or it will not pay, or is contrary to ethical standards, or spoils the customers, it just is not a good expenditure.
E. Be guided by the truth that in this world no person, people or nation can for very long get anything unless it is earned.

TRANSITION TOPICS

RECONVERSION— Scarcity of materials large obstacle in path of resumption of peacetime goods production, but volume within year expected to exceed 1939 level by 30 per cent. See page 75.

WESTERN STEEL—Westerners making plans for reconversion of Kaiser's Fontana, Calif., plant to peacetime basis. See page 78.

SMALL BUSINESS— Restoration of freedom held essential to remove business' fears. Spokesman contends restrictions and directives are hampering normal function of private enterprises. See page 82.

PER-TERMINATION AGREEMENTS— War and Navy Departments seek to negotiate settlement agreements with 19 companies representing 90 per cent of steelmaking capacity. See page 85.

CARTELS— State Department proposes international agreement to prohibit participation in international agreements which restrain trade, restrict access to world markets, and foster monopolistic control. See page 88.

AUTOMOBILES— Outlook for early release of materials for passenger cars gloomy. Schedule calls for production of 2,000,000 units in year ending July 1, 1946. See page 91.

LIGHT METALS— Disposal of light metals manufacturing facilities in the West will be explored at conference in Seattle June 21-22. See page 97.

Berge Says Trade Groups Help Preserve Individual Enterprise

Assistant attorney general points out that association activities in promoting efficiency in production and distribution, and other functions, are more essential now than formerly. Must make competitive system function

TRADE associations can do much to preserve individual enterprise in business and thereby assure people a more abundant life than is possible under any other type of economic organization, Wendell Berge, assistant attorney general, declared in an address before the Washington Trade Association Executives recently.

Discussing "Trade Associations and the Antitrust Laws," Mr. Berge pointed out that trade association activities directed toward development of efficiency in production and distribution through technical research, the development of new products and new uses for old products, elimination of product misrepresentation, and supplying industry information to the government, as well as representation of industry interests in dealing with government, labor and consumer groups are more essential now than formerly.

"The important thing is the fundamental attitude of trade associations toward our competitive system," he declared. "If trade association members and their executives have an intelligent awareness of what is going on today in American economic life, they will be able to see their own activities with reference to the economic picture as a whole. They can then chart their courses accordingly. Such awareness, in my opinion, is bound to influence trade association action toward policies that will preserve rather than destroy our competitive system.

"If policies of this kind are adopted and pursued, I am sure that you will find yourselves treading in the same general direction as your government and that, indeed, law enforcement activity and trade association activity will proceed side by side.

"We in this country are becoming increasingly mindful of the need to make our competitive system function effectively. We are more than ever aware of the necessity of keeping the doors of opportunity open for individual effort," Mr. Berge said.

He called attention to "the fundamental change that has occurred during the last generation in the practical nature of the problem of monopolies and restraints of trade. Formerly, we were most concerned with corporate mergers which gave to a single corporation, or two or three large corporations, the virtual control of an industry. The principal problem today is that of keeping business organizations which are technically separate and ostensibly competitive from getting together through one subtle device or another to effectually eliminate real competition between them.

"In determining future trends," Mr. Berge predicted, "the activities of businessmen in trade associations will play no small part. Trade associations, if properly utilized, can be an important factor in weeding out unfair competitive practices, and in introducing and promoting policies which make industry more efficient and secure a wider and more economical distribution of goods for the benefit of consumers. Trade associations, if intelligently directed by men of vision, can be instruments for expanding trade and commerce rather than restricting it. But whether these associations shall in the long run contribute to the ultimate salvation of our business life or to its destruction depends, I believe, to a large degree upon their fundamental attitude: Are they seeking to expand production and distribution at lower costs so that an ever increasing body of consumers can purchase a greater volume of goods at lower prices; or are they seeking to restrict production, regiment distribution, raise prices and corner the profits for that little group that is fortunate enough to belong to the club?"

Hurley Explains Surplus Property Board's Plans

The chain of thinking which led the Surplus Property Board to adopt two "key" regulations, shortly to be an-

LEWIS B. SCHWELLENBACH

TOM C. CLARK

CLINTON P. ANDERSON

In the first major reorganization of his administration, President Truman has appointed these three men to important cabinet posts. New secretary of labor will be Lewis B. Schwellenbach (Dem., Wash.), a former senator and more recently a federal district judge. He succeeds Frances Perkins who held the office through Mr. Roosevelt's tenure. Tom C. Clark (Dem., Tex.), who will succeed Francis Biddle as attorney general, has been an assistant attorney general since 1937. Rep. Clinton P. Anderson (Dem., New Mex.) has been named secretary of agriculture.

nounced and put into effect, was outlined by Robert A. Hurley, board member and former governor of Connecticut, in a recent address before the executive committee of the Connecticut Manufacturers' Association, at New Haven.

One of these regulations will permit the owning agencies to sell surplus machine tools and allied equipment to war contractors in possession of them. The other will permit the sale of raw materials in short supply to manufacturers who need them for production of civilian goods.

"It has been impressed upon the board that certain segments of manufacturing enterprise, whose war contracts were in process of termination, wish to know now whether or not they can acquire government tools in their plants and, if so, under what terms and conditions. The board is aware that a speedy answer to this question was imperative if these plants were to get into civilian production rapidly," said Governor Hurley.

"In considering the question, the board was faced with important alternative courses of action. Whether to allow sales to contractors in possession at this time, before actual war contract cutbacks and terminations; or whether to withhold government owned tools until they have become no longer needed in war production in order to allow simultaneous access to them by all prospective buyers.

"We were aware that the imminence of the reconversion of certain war industries to peacetime production demands a clear statement of government policy in this matter. The speed with which industry is able to make the changeover depends in large part on the ability of industry to plan that changeover and the acquisition of government tools is a part, an important part, of reconversion planning. At the same time we had to consider whether or not there will be enough tools ultimately to satisfy all possible consumers.

Withholding Would Be Unwise

"We carefully canvassed the supply and the probable postwar demand for tools and, on the basis of that canvass, we have determined that there would be enough tools for all, and that to withhold tools from contractors in possession would not only be quixotic, but would work a very definite harm on industry and prevent it from getting into peacetime production at the earliest possible moment."

Such sales are to be carried out under uniform terms and conditions laid down by the board, said Governor Hurley, and without the necessity of waiting until the tools involved formally have been declared to be surplus.

The second of the two new regulations about to be issued, said Governor Hurley, is designed to speed up the sale of contractor inventory, so that raw materials, components and work in progress which are in short supply can be utilized by manufacturers to get into civilian production.

Pre-termination Agreements To Be Sought With Steel Producers

War and Navy Departments launch campaign to negotiate settlement agreements with 19 companies representing 90 per cent of steelmaking capacity of nation. Move part of general plan

THE WAR and Navy Departments have launched a campaign to negotiate pre-termination settlement agreements with 19 leading integrated steel companies.

The War Department has the responsibility for 14 companies. The Ordnance Department will handle the American Rolling Mill Co., Carpenter Steel Co., Inland Steel Co., Jones & Laughlin Steel Corp., Pittsburgh Steel Co., Republic Steel Corp., Sharon Steel Corp., National Steel Corp. The Corps of Engineers will handle Allegheny Ludlum Steel Corp., Colorado Fuel & Iron Corp., Wickwire Spencer Steel Co., Youngstown Sheet & Tube Co., Wheeling Steel Corp. and Copperweld Steel Co.

The Navy Department has the responsibility for the five companies. Bureau of Ordnance will handle Bethlehem Steel Co. and Crucible Steel Co. of America, while the Bureau of Ships will handle Alan Wood Steel Co., Lukens Steel Co., United States Steel Corp., and subsidiaries.

Represent 90 Per Cent of Capacity

These companies represent approximately 90 per cent of the steel business in the United States and, if they were to enter into some pre-termination agreements with the War and Navy Departments it would facilitate rapid setlement of terminated war contracts.

Pre-termination planning is simply agreeing before termination to a solution of some of the problems to be met at the time of termination rather than after. It speeds up settlements and clears plants more rapidly for new war or civilian production. The effort to plan in advance with the steel companies is only a part of a general campaign to plan in advance with as many contractors as possible for the handling of problems arising after termination.

The War and Navy Departments are organizing termination teams. The objectives of the program are to negotiate and draft pre-termination settlement agreements with the steel companies, specifying the method of arriving at various compensation and termination claims.

The agreements may contain: (1) An agreement upon the retention values of inventories to be retained by the contractors with a fixed price or by a definite formula for computation of such price.

(2) A method of pricing inventories containing products covered by OPA schedule No. 6 on the basis of established selling prices or adjustment to established prices.

(3) An agreed method of costing claims for products not covered by the OPA schedule.

(4) Agreed method of disposal of inventories which the contractor does not wish to retain.

(5) An agreement as to what items are to be scrapped.

(6) Agreed methods of counting and verifying the inventory and checking the accuracy of the claim to be filed with the contractor's customers.

Certain members of the steel industry requested authority to submit termination claims on the basis of established sales prices. The Navy Department Committee agreed the established selling prices together with any adjustments will establish a convenient method of settlement provided the government assured itself on the basis of evidence submitted by the company that their use would not result in granting more than fair compensation to the contractor. The War Department concurred in this.

Any agreement negotiated will be applicable to both prime and subcontractors of a company. Agreements can cover existing as well as future contracts for the classes of products covered by the agreements. With proper notice, either may withdraw from the agreement regarding future terminations.

FTC Pushes for Decision In Pittsburgh Plus Case

Further developments in the Federal Trade Commission's attempt to enforce its order that the United States Steel Corp. and its subsidiaries cease and desist from the practice of quoting steel products on the basis of Pittsburgh plus the freight rate to destination hinge on the decision of the United States Circuit Court of Appeals, Third Circuit, Philadelphia, on the validity of the Steel corporation's contention that the FTC order should be dismissed on the ground that conditions governing the sale of steel products have changed materially since the order originally was brought. In recent hearings Federal Trade Commission attorneys argued that any such changes are irrelevant insofar as the issues in this case are concerned, and that the case should proceed to a decision.

CINCINNATI

MEMORANDUM

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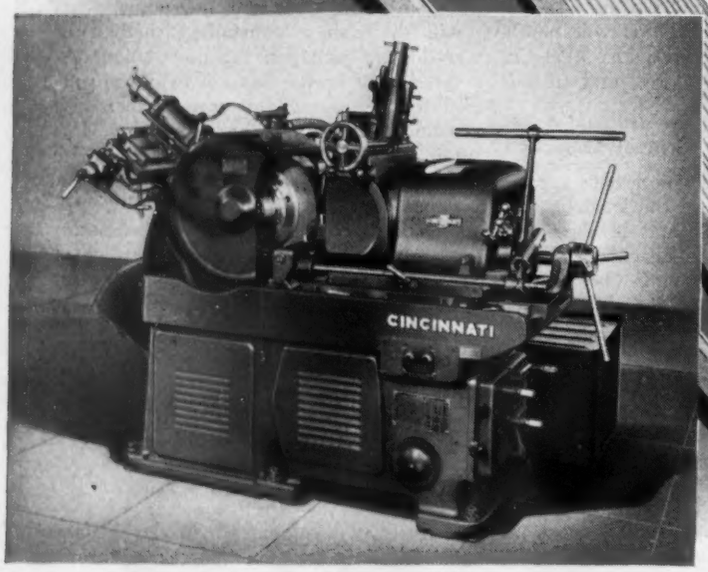

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State Department Hopes to Banish Restrictive Practices of Cartels

Department proposes international agreement prohibiting participation of commercial enterprises in contracts which restrain international trade, restrict access to world markets, or foster monopolistic control in international trade

STATE DEPARTMENT believes control of international trade by private cartels is a dangerous thing and is inconsistent with the economic philosophy which best serves the cause of peace and human well-being, William L. Clayton, assistant secretary of state, has informed the Senate Special Committee Investigating Petroleum Resources.

"We plan to propose to the nations of the world an international agreement to banish restrictive practices of international cartels," he said. "At this moment no one can say whether we shall be successful."

In the meantime, he said, it would be unwise to ease up on our antitrust laws. It is true that the application of the antitrust laws in foreign trade is quite uncertain, said Mr. Clayton. "The principal reason, of course, is that international business agreements and Webb-Pomerene activities, long unchallenged by enforcement authorities, are now subject to active investigation and prosecution by both the Department of Justice and the Federal Trade Commission. It will clearly require several years of active adjudication before the law regarding foreign trade practices is as well established as the law regarding domestic trade practice."

The alternative, he said, would be endowment of an administrative agency with an unusually large measure of discretion in determining reasonable standards of restraint in foreign trade; he doubted the ability of Congress to clothe such a law in sufficiently precise language, and he doubted the willingness of Congress to give such a measure of power to an agency.

The plan for international regulation which the State Department favors is an agreement among the various countries prohibiting participation of commercial enterprises "in contracts and combinations which restrain international trade, restrict access to international markets, or foster monopolistic control in international trade. We are under no illusions as regards the difficulties of obtaining general assent to such a program . . . but there are signs from abroad of a growing popular realization that such international business practices as price fixing, division of markets, limitation of production, and suppression of technology, have no place in an international effort to expand the trade of the world and to increase productivity and well-being. The information about the activities of international cartels which has been brought to light in this country has played a large part in increasing understanding of the problem the world over.

"It is not proposed to establish an international agency to enforce such an agreement on cartels. Rather, each government would enforce the provisions of the agreement within its own sphere of jurisdiction. Each government might agree to provide for mandatory filing with a suitable government agency of appropriate information relating to contracts and relationships affecting foreign trade . . . . The suggested program would recommend the establishment of an International Office for Business Practices, tied into the United Nations organization through the Economic and Social Council, to facilitate intergovernmental co-operation in the cartel field."

Unless such an international agreement to control foreign trade materializes, said Mr. Clayton, one cartel may lead to others because of their effect on trade and exchange.

"For example," he said, "Bolivia depends to a considerable extent upon tin exports for foreign exchange and public revenue. The maintenance of the tin cartel is therefore a matter of national interest to Bolivians. On the other hand, cartels in the chemical and other industries aggravate Bolivia's balance of trade difficulties by maintaining high prices upon imported commodities and by preventing so far as possible the development of manufacture in Latin America. Since various countries will probably be in urgent need of foreign exchange after the war, it is reasonable to expect that unless more constructive methods of cartel control are adopted, there will be pressure from some governments for cartelization of their principal exports, and that such pressure will be more vigorous when imports into such countries are also cartelized."

Murray and Scrugham Seek Metal Premium Legislation

Sen. James E. Murray, chairman, Senate Small Business Committee, and Sen. James G. Scrugham, chairman, Mining and Minerals Industry Subcommittee, co-introducers of S. 502, a bill which carries authorization for continuance of premiums to copper, lead and zinc mines hold that the legislation must contain the non-cancellable feature when it finally becomes law, it was revealed last week.

Under the bill as passed by the Senate, premiums would be guaranteed until June 30, 1945, on copper, lead and zinc mined for the war effort. However, the House Banking and Currency Committee has eliminated the noncancellable feature of the measure. Interested executive agencies of the government have indicated they would prefer to be in position to cancel the premiums when, in their opinions, it is no longer necessary to stimulate the production of these three important metals.

Krug Cites Need for Large Increase in Lead Production

Unless lead production is increased substantially, lack of this critical metal will interfere directly with the prosecution of the war against Japan and the fulfillment of the demands of important war-supporting activities, J. A. Krug, chairman of the War Production Board, and Paul V. McNutt, chairman of the War Manpower Commission, said recently. Mr. Krug urged that war workers released from shipyards, airplane factories, and other war plants after military cutbacks, take employment in lead mines. Lead mines are in a position to increase the output of this metal, he said, if a few thousand workers could be added to the present number of men employed.

Recommends Cut in Contract For Canadian Aluminum

War Production Board has recommended to the Metals Reserve Co. that the amount of aluminum to be purchased from Aluminum Co. of Canada's Quebec plants be reduced from 250 million pounds to 100 million pounds during 1945. The purchase contract, including a cancellation clause, was dated March 28, 1945.

Truck Industry Says It Can Meet Increased Program

The truck industry will be able to meet the demands of the additional 1945 program, representatives of the industry have informed the War Production Board. The additional program calls for 188,700 trucks in the second half of 1945 and consists of 85,000 light trucks, 95,000 medium, 5000 light-heavy, 3000 heavy-heavy, and 700 off-highway trucks.

Appointment

William S. Bradley of Dallas, Tex., has been appointed assistant to the secretary, Department of Commerce, in charge of surplus property.

PRIORITIES–ALLOCATIONS–PRICES

Summaries of revocations of and amendments to orders and regulations; official interpretations and directives, issued by War Production Board and Office of Price Administration

REVOCATIONS

The following orders have been revoked by WPB:

ELECTRIC DISCHARGE LAMPS: Order L-28-a which specified types and voltages of incandescent, fluorescent and glow-discharge lamps that could be produced. Restrictions contained in direction 1 of the order, prohibiting extension of preference ratings from lamps in one classified group to those in other groups, to replenish inventories, are retained in direction 13 to priorities regulation 3. (L-28-a)

BICYCLES: Order L-52 which restricted production of bicycles. (L-52)

LOCOMOTIVE PARTS: Order L-97-d which provided for the scheduling of critical locomotive component parts. (L-97-d)

HEATING EQUIPMENT: Order L-107 which restricted delivery of light-weight extended-surface heating equipment. (L-107)

FLATWARE AND HOLLOW WARE: Order L-140-b which controlled production and distribution of table flatware and hollow ware. (L-140-b)

WATER HEATERS: Order L-185 which controlled production of water heaters. (L-185)

MOLYBDENUM: Order M-110 which required reports on monthly sales of over 2000 pounds of molybdenum. The molybdenum reports will continue to be required under order M-21. (M-110)

AMENDMENTS

CLASS B PRODUCTS: A manufacturer now may exceed an authorized production schedule for a class B product in a case where he has obtained the material for another purpose and it can no longer be used for that purpose. The amended CMP regulation No. 1 continues the provision for filling a deficiency in a production schedule to the extent that a deficiency not exceeding 10 per cent in an authorized production schedule for a class B product during the first quarter of 1945 may be made up in the second calendar quarter of 1945. The regulation also provides that an order for alminimum bearing an AM number from AM-0001 through AM-9599, be treated as an authorized controlled material order. (CMP No. 1)

WAREHOUSE SALES: Amount of copper wire mill products for which a warehouse may enter warehouse stock replacement orders in any month has been increased from 25 per cent to 33 1/3 per cent of deliveries made from stock during the second quarter of 1944. Warehouses may enter also until July 1 deferred warehouse stock orders provided the total amount so ordered in any month does not exceed 33 1/3 per cent of deliveries made from stock during the second quarter of 1944, as reported to WPB on form WPB-3009. A warehouse is permitted, but is not required, to accept a "replacement" order from another warehouse, but if accepted the order must be treated as an authorized controlled material order. (CMP No. 4)

MRO SUPPLIES: Use of CMP regulation No. 5 ratings and symbols may be used to obtain maintenance, repair and operating supplies and jigs, dies and fixtures for reconversion to civilian production, in advance of actual production, by a person who proposes to start manufacturing a product he is not now making. In addition, WPB has uprated the residual rating for installation materials from AA-5 to AA-3. (CMP No. 5)

REPAIR PARTS: Use by repairmen of the preference rating of AA-3 assigned by CMP regulation No. 9-A is prohibited for the purchase of internal combustion engines (except air-cooled engines).

Revocation of direction 4 to CMP regulation No. 9-A now permits a repairman to use the V-3 allotment symbol to obtain copper pipe and tubing and copper-base-alloy pipe and tubing without the former restriction to certain sizes and types. (CMP No. 9-A)

MACHINE TOOLS: All special controls over the production and distribution of machine tools having a retail sales price of less than $1000 have been removed by amendment of order E-1-b. (E-1-b)

PLUMBING AND HEATING FITTINGS: Restrictions on the use of copper and copper base alloy in the manufacture, assembly and finishing of plumbing fixture fittings and trim have been removed by the revocation of schedule V to the plumbing and heating simplification order. (L-42)

AUTOMOTIVE REPLACEMENT PARTS: All restrictions on production and distribution of automotive replacement parts have been removed through a revision of order L-158. A preference rating of AA-1 is assigned under the revised order to producers of replacement parts and to the manufacturers of the components of such parts listed on schedules I and II, except parts and components for light trucks and passenger automobiles, for which a preference rating of AA-2X is assigned. (L-158)

COMMERCIAL DISHWASHERS: Controls limiting the volume of production of commercial dishwashers and restricting manufacture to specified types have been removed from order L-248. Restrictions on delivery of these items remain substantially unchanged. (L-248)

INDUSTRIAL TYPE INSTRUMENTS: Schedule 7 of order L-272 that restricted the production of industrial thermometers to specified finishes, sizes, types, models and markings has been revoked. Thermometer production will remain subject to provisions of order M-293 and other applicable orders. (L-272)

WOODWORKING MACHINERY: Preference ratings for class 2 woodworking machinery (that which had a producer's list price of $350 or less on Oct. 15, 1942) are no longer required. (L-311)

TOOL STEEL: The date after which purchasers of high-speed tool steel must accept the greater proportion of their requirements in low-percentage tungsten steel has been postponed from June 1 to June 30, 1945. Purchasers must accept 85 per cent of their high-speed tool requirements in class A tool steel, containing not more than 6.75 per cent tungsten, and only 15 per cent in class B, containing more than 12 per cent tungsten. Deliveries of class B high-speed steel, containing cobalt for use in the manufacture of tool holder bits are now exempted from provisions of the order. Counterweight parts for aircraft engines are not considered tool steel under the amended order. (M-21-j)

SILVER: All controls on the use of domestic silver have been lifted by an amendment to order M-199. Restrictions on the use of foreign silver continue in effect. (M-199)

OSMIUM: Consumers of osmium metal now may use in any quarter up to 12½ per cent of the amount they used in the year 1941, without restrictions as to when the osmium was alloyed. New users of the metal are allowed to use up to two ounces per quarter. (M-302)

INSTRUCTIONS

DOMESTIC STOVES: Rated orders for fuel-oil table stoves for export to countries other than Canada and United States territories or possessions are to be treated as unrated orders if the rating was applied or extended on or before May 26, 1945. (L-23-c)

STEEL BOILERS: Restrictions on the manufacture of low-pressure steel boilers intended for stock have been removed through an amendment to direction 1 to table 14 of the scheduling order. (M-293)

ELECTRONIC EQUIPMENT: No manufacturer may produce electronic equipment under priorities regulation 27 except to fill preferred orders, to fill authorized production schedules and programs as defined in CMP regulation 1 or fill schedules or programs authorized on a spot basis. PR 27 does not establish any authorized production schedule or authorized program for electronic equipment, nor can the AA-4 rating assigned by the regulation be used to purchase complete equipment, such as radios, since these are not production materials. Priorities assistance granted by PR 27 may not be used to accumulate reservoirs of component parts in anticipation of the resumption of civilian radio production. (PR No. 27)

LEAD CHEMICALS: Order M-384, governing use of lead chemicals, prohibits the use of lead for art pottery and decorative ceramics. However, appeals by producers of art pottery and decorative ceramics for the use of lead or lead chemicals held in the inventories of these producers as of March 27, 1945, will be considered by WPB. Such appeals should be filed in accordance with provisions of the order. (M-384)

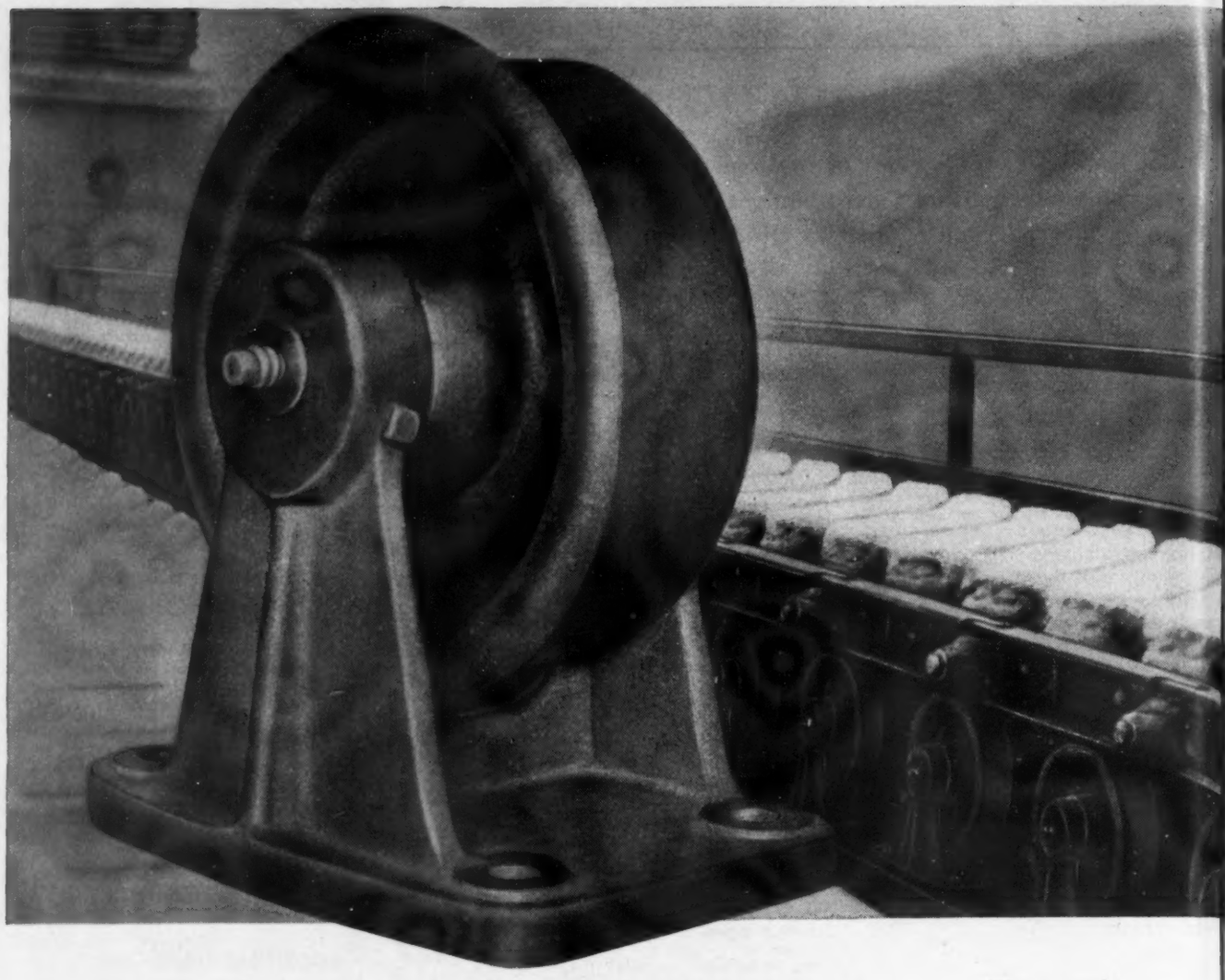
PRIORITY REGULATIONS

MRO SUPPLIES: The following items may no longer be obtained under blanket maintenance, repair and operating supplies ratings: Metal strapping; electric irons; domestic electric ranges; domestic and commercial electric fans; chronometers, chronographs and electric timers, excluding interval timers; compressors, reciprocating type for compressing air, in any size smaller than 10 horsepower, of the tank mounted design sometimes referred to as the service station type of compressors. These items have been added to list B of priorities regulation No. 3. If a rating is needed to obtain any list B product, application must be made on form WPB-541, or other form designated for that particular item or for use by particular persons. (PR-3)

PRICE REGULATIONS

ZINC SCRAP: A maximum price of 4.95c a pound, f.o.b. shipping point, for zinc base forming and stamping dies sold as scrap has been established. A quantity premium of ½-cent a pound is permitted on shipments of 20,000 pounds or more of the new grade either separately or in combination with new die cast scrap, old and new automobile radiator grilles, and old die cast scrap. (No. 3)

AUTOMOTIVE PARTS: Specially designed parts for military vehicles that are sold for civilian use have been placed under specific price regulation. The new ceilings cover all sales by manufacturers, wholesalers and retailers of specially designed automotive parts for military vehicles. A parts manufacturer who was in the business before January, 1941, will base his price on the highest price he charged in the six-month period ending March 31, 1942, or, where he did not make a charge, on a price quoted twice during that period. (No. 453)



Long-Lived Stationary Wheel Pig Casting Machine...

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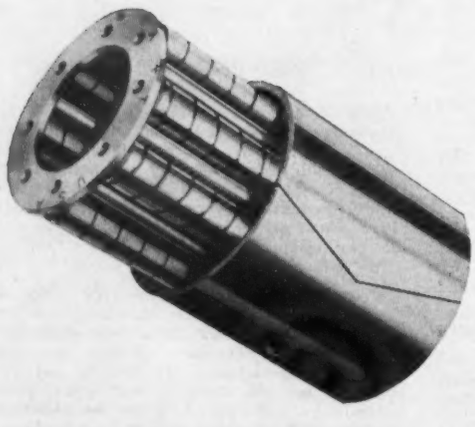

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Contributing enormously to the elimination of vibration in the machine and for freedom from high maintenance costs—Hyatt Roller Bearings are used to keep the wheels in accurate alignment and free-turning with minimum of attention.

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By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Outlook for early release of materials for automobile production dark. Automotive releases on parts and equipment going forth to suppliers, but deliveries are uncertain. Interlocking agency controls may hamper reconversion

DETROIT

IF ANY manufacturer of parts or subassemblies usable in passenger cars, whether he ever dealt with the automotive industry before or not, can see some open capacity in his plant over the next few months and can discern even a faint glimmer of a possibility of obtaining necessary materials without priority assistance, he had best take the next train or airplane to Detroit and start making the rounds of purchasing departments of the motor plants here. He will be welcomed with open arms—at least, right now, when the materials picture looks particularly black.

So far as the WPB is concerned, it has snapped on the green light for passenger car production after July 1, but as one industry observer said when informed of the news, "What, again?" Between now and July, the agency's L and M orders probably will be falling like leaves in the autumn breeze, as well they should. If it were only as simple as stamping the word "void" on a few sheafs of regulations, the outlook would be rosy. Unfortunately, paper work is the least part of the car manufacturing program now being mapped.

Little "Free" Steel Likely

It is stated no priority assistance can be provided on materials, beyond the open-ending of CMP on July 1. How much this will mean is not clear, since third-quarter allocations of steel, for example, under the CMP ticket system are said to call for the entire tonnage likely to be rolled, leaving comparatively little to be scrambled for in the "free" market. The steel producers, as well as a good many parts suppliers, do not entirely subscribe to this gloomy outlook painted by the WPB; in fact that is one reason why the WPB relaxed its controls, because it was assured by the auto industry their buyers would take chances on obtaining parts and materials if given free rein. Beyond the question of basic raw materials, however, are many complexities as yet unanswered—the single matter of plating, for example, and where to get the necessary cadmium, zinc, copper, nickel and chromium.

Automotive releases are definitely in suppliers' hands—telegraphic instructions to proceed with production on orders placed months earlier and in conformity with shipping schedules carried on these orders. When asked about this, Henry P. Nelson, WPB automotive reconversion director, said he had seen such telegrams but did not believe they were actual releases, but just an "alerting" of suppliers. Few recipients of the wires would agree with him.

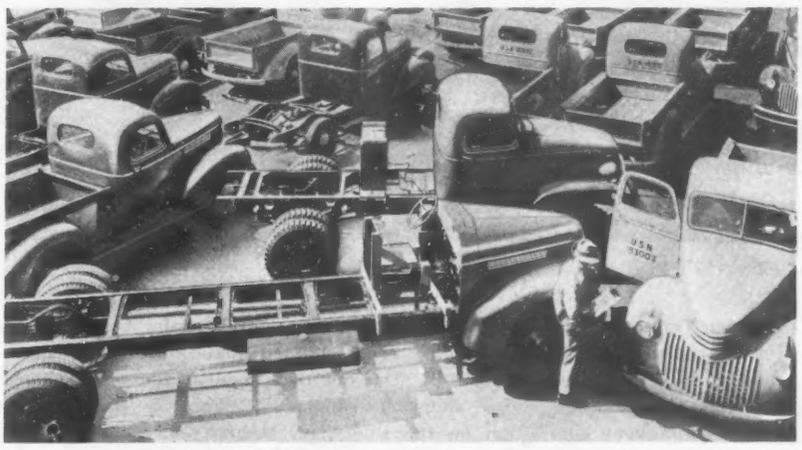
No great enthusiasm greeted the WPB's O.K. of 214,678 passenger cars over the balance of this year. The quota, amounting to about 5 per cent of a normal year's production, is felt generally to be far too small, both from the standpoint of maximum employment of labor and of permitting operations in the black. Looking ahead, WPB experts see the possibility of the industry making 400,000 cars in the first quarter of 1946, and 1,400,000 in the second quarter, to make a total of something over 2,000,000 for the first year of authorized production. WPB has said it will assign individual production quotas to each manufacturer, with the smaller producers' allotments adjusted upward, and provisions made for the possibility of new producers entering the automotive field.

Actually, the WPB would like to wash its hands of the entire matter of controls over production, but it is fearful of chaotic conditions envisioned as the possible result. Furthermore, WPB controls are interlocked with those of other agencies, such as the WMC, Selective Service, Surplus Property Board and the military procurement services, and if the WPB should make a clean break, it might place the other agencies in an embarrassing position.

But if reconversion is to get anywhere at all without tiresome delays, these other agencies must act in concert. Thus, there has been no realistic cancellation and termination of war contracts by the military services following the defeat of Germany. A few dribs here and a few drabs there, but nothing commensurate with the apparent decrease in requirements. Even the recently announced cutbacks in aircraft production, described as monumental, amount to only 17,000 planes over the next 18 months, or less than 1000 per month, and aircraft are being produced in excess of 5000 per month. After World War I, aircraft orders were cut to the bone within three days. Granted an extensive Pacific campaign still remains ahead, many think the aircraft program could have been cut back 70 per cent immediately after V-E Day, or perhaps even sooner, and more than ample production would have continued to supply Pacific requirements. Considerable mystery surrounds the slowness of contract reductions in all types of military equipment. Clear this up, and the materials problems for reconverting civilian industries would vanish.

The auto industry urges the immediate elimination of all controls of the War Manpower Commission as a first and major step in clearing up principal materials shortages which in many cases exist because of maldistribution of manpower. Remedy is an unrestricted flow of workers to industries where jobs are waiting.

Also, general order 5-10 issued by Mr. Byrnes of the Office of War Mobilization and Reconversion early this year, and requiring any civilian goods producer desiring to exceed the production level of the fourth quarter of 1944 to obtain WMC approval before so doing, is ridiculous now when the goal must be to try to exceed the 1944 level of production in order to provide more employment in civilian goods manufacture. Furthermore, as long as Detroit remains a No. 2 labor area by WMC definition, provisions of this order remain in force. A concurrent "nuisance" regulation is the 1 per cent limitation on use of technical personnel on civilian



TRUCKS: Assembly lines at Chevrolet plants are producing a heavy volume of military and essential civilian trucks. Shown here are the various current models, including Army, Navy, school bus chassis and cab, light delivery and ton-and-a-half chassis and cab

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goods engineering, which should be tossed in the ashcan.

Meanwhile local draft boards are refusing to recognize WPB certification of tool and die workers for reconversion work as grounds for deferment. Similar threats hang over machine tool builders and in fact any other employer active in reconversion.

Although the Surplus Property Board has announced the granting of permission to contractors for purchase of government-owned equipment in their possession, little has been done for contractors not in possession of such tools who under the present setup will have to wait two or three months while such equipment becomes idle, is screened by the services and is declared surplus to RFC. Along the same line, regulations prohibiting the release of frozen company-owned equipment remain to be lifted.

Holds War Plants "Expendable"

A broader interpretation of the War Surplus Disposal act, as far as it relates to the selling or leasing of government-owned war plants and machinery to industry, is held vital by J. H. Marks, Packard executive vice president, who was instrumental in the launching of the government's Defense Plant Corp. Packard's Rolls-Royce and marine engine plants, in fact, are listed as Plancor No. 1, the first facility equipped by DPC. Mr. Marks declares war plants should be considered as expendable as combat weapons, since the speed of their erection often meant savings of American lives (the Ford Willow Run plant cost about $100 million, or roughly the equivalent of one battleship); therefore they should be sold or leased at fair prices, now making allowances for the artificially high cost of first construction, war-dictated plant protection features not needed now, age and obsolescence.

One of the most logical but at the same time unlikely, suggestions for disposal of the Willow Run bomber plant has been to sell or lease it to the UAW-CIO for its full management, staffing and operation. For years, the UAW has been trying to tell other managements how to run their business, how much to pay employes, how long to work, how much production to turn out, etc. Here would be a chance for the union to have a nice, big plant of its own and it could institute any and all regulations, wage rates, productivity, and discipline it cared to, with no one objecting. Commenting on the idea, a union spokesman says it would be impossible because the large manufacturers have a throttle-hold on their suppliers, so the union could obtain no materials or parts; and further the union has only a couple of million dollars in its treasury so could not afford the investment, particularly with current dues payments shrinking fast. Meanwhile R. J. Thomas, president of the UAW-CIO, visited with President Truman to explain unemployment prospects in Detroit, and came away with the observation, "Things look pretty black." His next move is to visit with Henry J. Kaiser on the West Coast to try to persuade him to acquire Willow Run for production of some Kaiser Kars.

There has been considerable to-do in WPB and industry circles over an alleged dire shortage of large body presses required for production of body stampings. Mr. Nelson in his recent conference explained this situation looked much better now. Asked for details, he said some of the press manufacturers had employed outside engineering services on a jobbing basis to assist on the engineering of new installations, relieving the undermanned press companies of some of this work and thereby speeding ultimate delivery of the equipment.

Actually, according to one of the larger press manufacturers, there is no shortage of presses in the autobody shops, at least as far as the larger double-action and triple-action units are concerned. In few if any cases were these heavy presses moved to make way for war work. Some were converted to war stampings, both steel and aluminum, but their reconversion is only a matter of switching dies. Most of the Fisher stamping plants, Briggs, Murray, Ford, De Soto and other leading suppliers of body stampings have all their prewar equipment in place and should be able to start production as soon as new dies are available. The hue and cry over the slowness of deliveries of new presses, in this observer's opinion, relates to orders placed for expansion of capacity beyond the prewar level. Obviously this equipment will not be needed for a year or more, but the buyers are characteristically keeping the heat on the builders.

Hudson Meeting Protested

Total number of common stockholders of Hudson Motor Car Co. represented by Carsten Tiedeman, regional WPB director at the Hudson stockholders meeting was incorrectly stated here last week. Actually he held proxies for about 406,000 shares out of a total of 1,596,000 shares outstanding, and 1,188,000 shares voting at the meeting. Mr. Tiedeman, who is a brother of Mrs. Roy D. Chapin, widow of a former president of Hudson, withdrew his proxies, leaving 782,000 shares actually voting, or some 16,000 short of a majority. On this ground, Tiedeman protested the legality of the meeting, but some legal advisers say he should have withdrawn his proxies before the meeting to make their dissent authoritative. Kernel of the dispute was an offer made earlier to the Hudson management by a New York banker said to represent the Fisher brothers of Detroit to buy 400,000 unissued Hudson shares at book value of $22.61 each.

The offer was not accepted and there appears doubt it will be remade. If such a deal were concluded, the purchase together with the support of the 406,000 proxies held by Mr. Tiedeman and backing the Fishers, would give the brothers control of the company, at a cost to them of around $9,000,000.

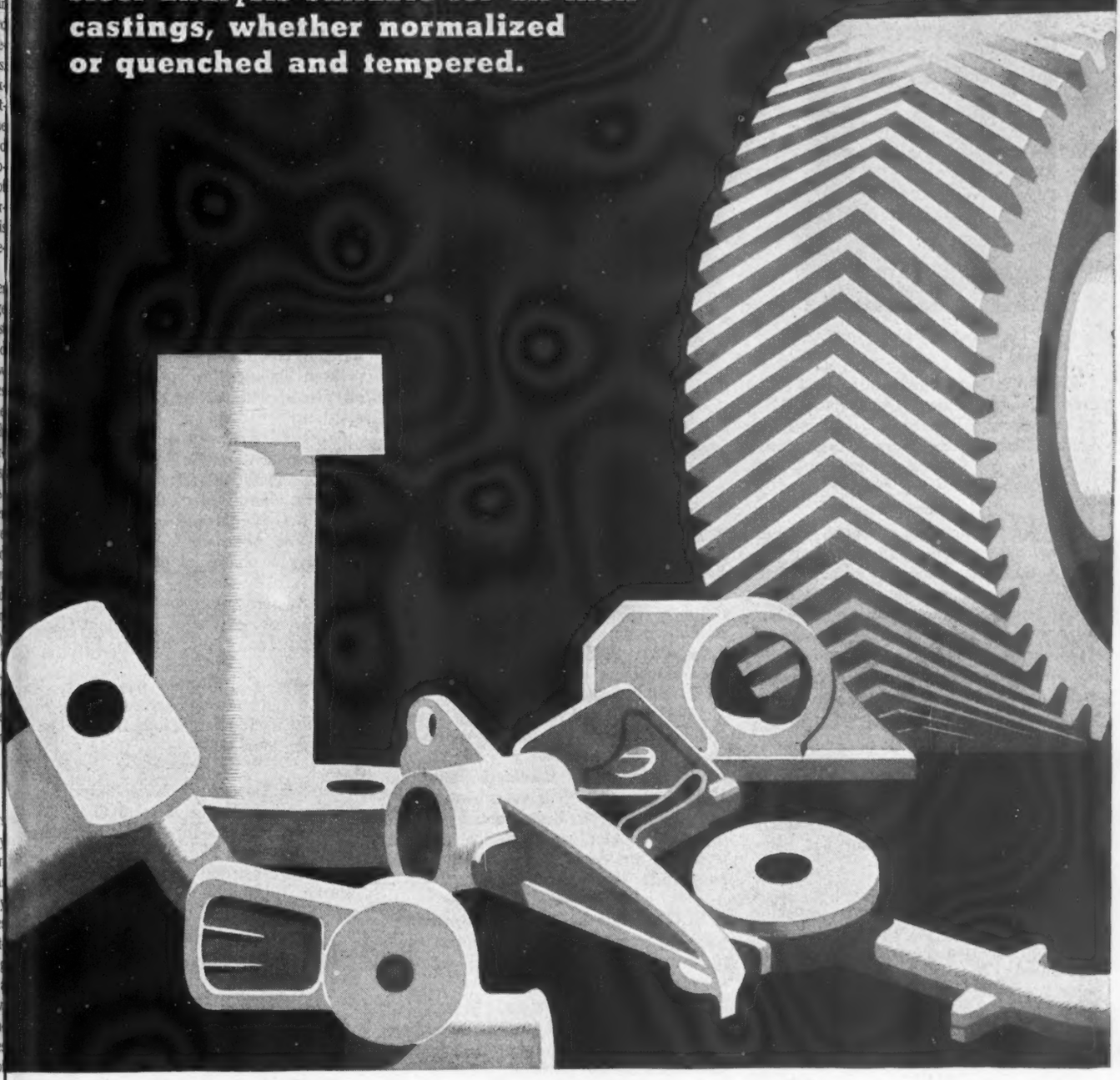
WENDELL H. WELCH

COL. GRAHAM B. TRAINER

Colonel Trainer has been named general manager of Chrysler Corp.'s China service contract and Mr. Welch has been appointed manager of the executive division of the contract in Detroit. The contract involves the establishment in China of 15 large repair shops for the maintenance of thousands of trucks throughout China and on the Ledo and Burma roads. Projects will require about 500 American engineers, technicians and mechanics, as well as about 3000 Chinese.

During the past three years, Colonel Trainer has been working with the Army on supply problems in the war theaters. Mr. Welch will supervise the employing and training of mechanics for the work, procuring and shipping tools to China, and act as liaison with government agencies

Many foundries find one molybdenum steel analysis suitable for all their castings, whether normalized or quenched and tempered.



CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

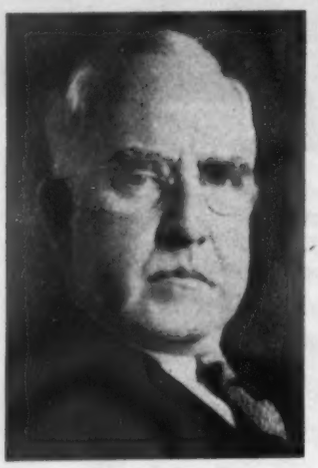
ARMY E NAVY

MOLYBDIC OXIDE, BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Molybdenum Company

500 Fifth Avenue · New York City

MEN of INDUSTRY



FRANK C. HASSE

H. A. FORSBERG

Frank C. Hasse has been elected vice president, Mechanical Department, Oxweld Railroad Service Co., a unit of Union Carbide & Carbon Corp., New York. He has been associated with the Oxweld company since 1913.

—o—

William Seymour Jr. has been elected assistant vice president, Joseph T. Ryerson & Son Inc., Chicago. Since 1936, he has been general superintendent of the Ryerson Chicago plant, and labor relations manager of the entire group of 11 Ryerson steel service plants. **Merle A. Miller** has been appointed assistant treasurer of the Ryerson company. He also will retain his position as manager of the credit division.

—o—

Adolph G. Schroeder has resigned his position in the machinery and equipment department of Iron & Steel Products Inc., Chicago. No successor has been named.

—o—

John W. Lohnes, formerly assistant general manager of sales, Vanadium Corp. of America, New York, has been appointed Chicago district sales manager, succeeding the late **Le Roy F. Johnson. Lawrence C. Miller,** formerly assistant treasurer of the corporation, has been elected treasurer.

—o—

Roy E. Anderson has been elected president of the A. F. Anderson Iron Works, Chicago. He is the son of the late founder of the company and was formerly vice president and secretary. **E. E. Anderson** has been elected vice president and secretary while **Harry Silberman** has been elected treasurer.

—o—

J. P. Dods, Norristown, Pa., has resigned as director of advertising, Columbia Steel & Shafting Co., Carnegie, Pa., Edgar T. Ward's Sons Co., Pittsburgh, and Summerill Tubing Co., Bridgeport, Pa. He plans to open his own office soon as sales and advertising counsel.

—o—

George W. Walton has assumed the post of manager of drilling machinery sales, International Derrick & Equipment Co., Columbus, O. He was previously associated with Clark Bros. Co. Inc., Olean, N. Y.

—o—

Henning A. Forsberg recently was appointed manager of operations for all works of Continental Foundry & Machine Co., East Chicago, Ind. He has been associated with the company since October, 1915, and had been general superintendent of the Chicago Works since 1931. **J. Edwin Johnson,** who has been associated with the company since 1922 and as sales engineer since April 1, 1944, succeeded Mr. Forsberg as general superintendent, Chicago Works.

—o—

Lieut. Joseph C. Belden Jr., returned after two and one-half years active duty with the Navy, has been elected assistant secretary, Belden Mfg. Co., Chicago. He is son of the late founder of the company and a director since 1937.

—o—

E. O. Paullin has been appointed factory representative and welding engineer in Detroit for Una Welding Inc., Cleveland.

—o—

William J. Scott has been appointed assistant general manufacturing manager, Chevrolet Motor Division, General Motors Corp., Detroit. A veteran of 30 years continuous service with Chevrolet, he had been manager of the division's gear, axle and forge plants in Detroit since 1939 and also, since 1942, in charge of war production at Chevrolet aluminum forge plants in Muncie, Ind., and Saginaw, Mich.

—o—

Miles K. Smith, metallurgical engineer, has recently become associated with **William H. Phillips,** vice president, and **Norman F. Tisdale,** chief metallurgist, Molybdenum Corp. of America, Pittsburgh. Mr. Smith has been connected with the steel industry in various branches for 15 years and has had a wide experience in the procurement and use of most of the alloys used in the industry. He will act in the capacity of sales and service engineer for the corporation.

—o—

Paul W. Bernhard has been appointed advertising manager, Morse Chain Co. Ithaca, N. Y. He was formerly associated with Bell Aircraft Corp. and Curtiss-Wright Corp. at Buffalo.

—o—

Frank M. Aldridge has been appointed general sales manager, Ohio Tool Co., Cleveland. He was formerly deputy regional director in Cleveland of the War Production Board.

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S. Leroy Crawshaw has been appointed manager of engineering and sales, Western Gear Works, Lynwood, Calif. **W. A. Witham** has been appointed assistant manager of engineering; **P. L. Bannan,** company treasurer, has been appointed manager of manufacturing for all plants, with **G. A. DeArmand** as his assistant.

—o—

Falcon Bronze Co., Youngstown, O., has appointed **T. C. Watts,** assistant manager in charge of personnel and supplies; **J. C. Lepatta,** tube foundry superintendent; **Warner A. Wick,** assistant manager in charge of production.

—o—

H. A. Schimberg has been appointed director of purchases, LaPlant-Choate Mfg. Co. Inc., Cedar Rapids, Iowa.

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Stanley G. Disque has been appointed Indiana engineering service representative, Sterling Alloys Inc., Woburn (Boston), Mass.

—o—

Boyd E. Cass has been appointed welding engineer, Foote Mineral Co., Philadelphia. He was formerly with Carnegie-Illinois Steel Corp.'s Youngstown, O., district works, and Baldwin Locomotive Works, Eddystone, Pa., where he was senior metallurgist.

—o—

John T. Benton has been elected president, Engineers Club of Birmingham, Ala. **Ralph Y. MacIntyre** was elected vice president, and **Sprigg C. Ebbert,** secretary-treasurer.

—o—

C. Wohlhuter has been elected vice president and re-elected secretary of Burgess-Norton Mfg. Co., Geneva, Ill. **W. T. Crane,** formerly assistant purchasing agent, has been appointed assistant to the president, **Charles M. Burgess.**

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Rowe D. Staub has been appointed sales manager, Hood Refining Co., Greensburg, Pa. He was previously associated with Sealed Power Corp., Muskegon, Mich.

—o—

G. P. Vincent, manager of the sales development and technical service department, the Mathieson Alkali Works, New York, has been appointed to the newly created position of technical director. In addition to his former duties, he

R. S. REYNOLDS

H. C. CRANDALL

DR. HARRY WHITTAKER

will direct research and technical development and advise on technical matters concerning plant operation. In these latter capacities, he succeeds **R. E. Gage,** who was director of research and development for Mathieson for 14 years and has now been appointed technical adviser of the company.

—o—

R. S. Reynolds, president, Reynolds Metals Co., Richmond, Va., has been elected chairman of the board of directors, Reynolds Internacionale de Mexico, which will operate an aluminum plant in Mexico.

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A. M. Andrews, veteran war pilot, has joined the staff of the Briggs Clarifier Co., Washington, as one of the chief service engineers for the Aviation Division.

—o—

P. V. Black has been appointed Pacific district operating manager, Graybar Electric Co. Inc., New York, with offices in Los Angeles.

—o—

Erson V. Ogg has been appointed director of the recently established Industrial Relations Department, Pittsburgh Plate Glass Co., Pittsburgh. **Clarence J. Moser** has been named director of labor relations, replacing the late **Fred Keightley.**

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C. E. Stephens, vice president, Westinghouse Electric Corp., Pittsburgh, has retired from active service with that company after 45 years of service.

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Westinghouse Electric Supply Co., Chicago, has made the following appointments: **Albert L. Wiegenstein,** apparatus and supplies manager for the north Pacific district; **C. M. Reynolds,** manager of the Corpus Christi, Tex., branch; **G. H. Lineberry,** apparatus and supplies manager for the Pittsburgh district; **Charles R. Lee,** manager of the New Orleans branch; **L. J. Clay,** manager of the San Antonio, Tex., branch; and **H. E. Bailey,** district utilities manager for the north Pacific district with headquarters in Seattle.

—o—

Horace C. Crandall, who has been placed on inactive service from the Navy, has opened an office as a consulting engineer at 475 Fifth avenue, New York. Prior to entering the service he was president of the Crandall Engineering Co., Boston. He is specializing as a consultant in design of waterfront and heavy structures, including drydocks, marine railways, foundations, piers and wharves, shipyard facilities and harbor works.

—o—

Harry J. Kelley has retired as first vice president and general manager, Dominion Steel & Coal Corp. Ltd., Sydney, Nova Scotia. Mr. Kelley had been associated with that corporation for 21 years and prior to that was with the Lackawanna Steel Co. and its successor, the Bethlehem Steel Co., for a period of 35 years, at Lackawanna, N. Y. He will remain a director of and will act as a consultant to Dominion Steel.

—o—

Lieut. Col. John Kennedy Beeson, who recently completed his duties with the United States Strategic Air Forces in Europe, has been elected executive vice president, Pittsburgh Steel Co., Pittsburgh. Colonel Beeson is the son of the late **Charles E. Beeson,** one of the founders of the company. When he enlisted in the Air Corps in May, 1942, he was vice president in charge of sales for Pittsburgh Steel.

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Fred Brown has been appointed staff engineer, general sales department, Copperweld Steel Co., Glassport, Pa. He was formerly New England sales engineer for the company. **H. M. MacDougal** has succeeded Mr. Brown in the New England territory.

—o—

Lee D. Cosart, widely known automotive executive who has been with Dodge and Plymouth divisions, Chrysler Corp., Detroit, for nearly 20 years, has joined **J. O. Fisher** as a partner in the Dodge dealership at Portland, Oreg. He will leave Detroit June 15 and assume his Portland responsibilities July 1. Mr. Cosart was named sales manager of the Dodge truck division in 1940 and since the war has been staff executive at the Chrysler tank arsenal in Detroit.

—o—

Dr. Harry Whittaker, nationally known diamond expert and crystallographer, has been appointed research head for the Koebel Diamond Tool Co., Detroit. Dr. Whittaker will continue research begun for the National Academy of Science, grading industrial diamonds according to their crystal structure and specific ability. He formerly was instructor of crystallography at the Massachusetts Institute of Technology and later headed the ceramic research department of the Crane Co., Chicago.

—o—

Samuel S. Williams, president, Bradford Machine Tool Co., Cincinnati, retired May 31 but retains a place on the board of directors. He started with the firm 44 years ago and has been president since 1927. **J. R. Stewart** succeeds Mr. Williams as president.

—o—

L. R. Hussa has been elected president, Albina Engine Works, Portland, Oreg., advancing from the position of vice president and general manager to succeed **George Rodgers** who has retired. The latter founded the Portland Steel Shipbuilding Co. in 1906 which later joined the Albina firm. Mr. Hussa, formerly with Todd Shipyards Corp., New York, has been with Albina since 1922.

—o—

F. H. Kilberry has resigned as president and general manager, Atlas Imperial Diesel Engine Co., Oakland, Calif.

—o—

H. V. Erben has been elected a director of Allegheny Ludlum Steel Corp., Brackenridge, Pa. Mr. Erben, who is commercial vice president and assistant general manager, Apparatus Division, General Electric Co., Schenectady, N. Y., succeeds **Ralph J. Cordiner,** who has re-

MEN of INDUSTRY

C. W. BETTCHER

Who has been elected president of Eastern Machine Screw Corp., New Haven, Conn., and who will still direct sales and advertising, as reported in STEEL, May 28, p. 92

CHARLES M. JONES

Who has been appointed vice president in charge of engineering, John A. Roebling's Sons Co., Trenton, N. J., as noted in STEEL, May 7, p. 95.

E. R. JOHNSON

Recently named divisional superintendent, Canton Steel Division, blast furnace, and coke plant, Republic Steel Corp., as noted in STEEL, May 28, p. 94.

signed from the Allegheny Ludlum board because of the pressure of his duties as vice president and assistant to the president of General Electric Co.

—o—

Henry A. Lowery of the Seaboard Steel & Iron Corp., Baltimore, has been elected president of the Steel Club of Baltimore, succeeding **Warren D. Bourquin,** Republic Steel Corp. **John A. Malloy** of Joseph T. Ryerson & Son Inc. has been elected vice president and **Joseph A. Doyle Jr.,** Jones & Laughlin Steel Corp., secretary and treasurer. **C. W. Test,** Youngstown Sheet & Tube Co., has been made an honorary member. Mr. Test is now of Philadelphia and was formerly of Baltimore.

—o—

Merle J. Trees has been elected to the newly created position of chairman of the board, Chicago Bridge & Iron Co., Chicago. **Horace B. Horton** was elected president to succeed the late **George T. Horton.** Mr. Trees formerly was executive vice president of the company while Mr. H. B. Horton was vice president and treasurer and will continue to hold the latter position as well as that of president.

—o—

John M. C. Pease, formerly advertising manager, and **Frank J. Simpson,** assistant sales manager, have been elected vice presidents, Electric Household Utilities Corp., Chicago.

—o—

E. E. Robbins of Tulsa, Okla., has been appointed director, Division of Materials, Petroleum Administration for War, Washington. He was formerly a special representative on petroleum matters for the United States Steel Export Co., New York. **William Howard Collins** has been named assistant director of the division.

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J. Frederick Rogers, president, Beals, McCarthy & Rogers, Buffalo, has been elected second vice president, Buffalo Chamber of Commerce.

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A. G. Trumbull, chief mechanical engineer for the Advisory Mechanical Committee of the Chesapeake & Ohio, Nickel Plate and Pere Marquette railroads, has been appointed general mechanical engineer for the three railroads. He has been identified with these companies since 1929.

OBITUARIES . . .

Frank Willett Walton, 76, former manager, Westinghouse Electric Corp.'s Equipment Division in Bloomfield, N. J., died May 20 in Montclair, N. J.

—o—

Guilford Duncan, 67, president, the Ludlow-Saylor Wire Co., St. Louis, died recently in that city. He joined the company in 1900 and became head of the firm in 1911.

—o—

Capt. Frank Taylor Cable, 81, consulting engineer, Electric Boat Co., Groton, Conn., died May 22 in New London, Conn. A leading figure in submarine construction for more than 50 years, Captain Cable was commander of the HOLLAND, the first successful submarine constructed in the United States and accepted by the Navy in 1900.

—o—

Alfred Marshall, 60, for many years employment manager of the Chevrolet Motor Division, General Motors Corp., in Detroit and Flint, Mich., died recently at Tucson, Ariz. He joined Chevrolet at Flint in 1919 and retired from active business in 1942.

—o—

Ransome T. Lewis, 77, general manager of the American Bridge Co.'s plant in Elmira, N. Y., and former president of the Elmira Precision Tool Co., died recently in that city.

—o—

Rauley O. Mongan, 44, consulting engineer and vice president of Metals Reclaiming Corp., Spencerport, N. Y., died May 22 in New York. He was formerly an engineer with SKF Industries Inc., Philadelphia, and since the beginning of the war has been engaged in research for the Navy laboratory, Army Ordnance, and Chemical Warfare Service.

—o—

C. W. Spaulding, 60, sales manager, Ewart Division, Link Belt Ordnance Co., Indianapolis, died May 25, at the Union League Club in Chicago, where he was attending a conference.

—o—

Harry Gross, president, Atlantic Metal Products Co., Long Island City, N. Y., since he founded it in 1932, died recently at his home in Brooklyn, N. Y.

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Edwin R. Fellows, 80, president, Fellows Gear Shaper Co., Springfield, Vt., died at his home May 22, as noted in STEEL, May 28, p. 75. He founded his company in 1896 and developed many unique machines and cutters, holding about 35 patents covering gear manufacturing equipment. In 1899, he received the John Scott medal "for a machine and cutter for generating gear teeth."

—o—

J. Howard Chambers, 87, former president of Chamber Bros. Co., Philadelphia, manufacturing machinist, died May 22. He retired in 1941 after serving the company 65 years, the last 30 as its president.

—o—

Robert H. Darnton, 63, superintendent, forge plant, Buick Motor Division, Flint, Mich., and associated with Buick for 33 years, died May 28.

Light Metals Industry Conference Planned at Seattle June 21-22

Objective of meeting will be postwar maintenance and operation of war-created industry in 11 western states. Producers, technologists, economists and government officials to participate in discussions

NATIONAL attention will be directed to the light metals industry of the West —its spectacular wartime development and its postwar prospects—when the Western States Council holds a two-day conference on this subject in Seattle June 21 and 22.

Attending the meeting will be producers, technologists and economists in the light metals field, government officials charged with the disposal of surplus war property, several western senators and congressmen who have been prominent in light metals developments. Representatives of transportation lines and power companies also are expected to attend.

Objective of the conference is postwar maintenance and operation of an integrated light metals industry in the eleven western states under private ownership.

The Western States Council was organized in October, 1944, to co-ordinate western action on matters of regional concern. It is made up of executives of chambers of commerce in all eleven western states. Christy Thomas, executive vice president, Seattle Chamber of Commerce, is president of the council.

First project undertaken by the organization was an intensive study of the West's steel industry and its post-war potentialities. Following a two-day conference held at Salt Lake City in February, a comprehensive program was set in motion to retain this industry as a permanent and integrated factor in western economy. Private ownership and operation is the goal.

Development Was Spectacular

The urgent need for light metal in the war production program brought great expansion to the West's aluminum and magnesium industries. The most spectacular development of aluminum reduction has taken place in the Pacific Northwest, where new war plants have been built to take advantage of the low-cost electrical energy.

But the light metals industry of the West is not complete. Concentrated in the Pacific Northwest are five new aluminum reduction plants and one magnesium reduction plant. There is but one rolling mill, located at Spokane. There are no extrusion plants in Washington and Oregon, and those in California and Arizona are widely removed from the reduction plants in the Pacific Northwest.

Soon to be in operation is a new plant at Salem, Oreg., owned by the Defense Plant Corp. and operated by the Columbia Metals Corp. which will produce alumina from native Pacific Northwest clays. There are extensive deposits of alumina-bearing clays in the region and it is believed the Salem plant may point the way to economical utilization of these clays supplementing the importation of bauxite ore.

If an integrated Western industry, encompassing every step in the production cycle from raw material to finished products, can be developed it will be of great importance to the entire area.

Pacific Northwest Yards Still Recruiting Labor

Rumors of cutbacks are denied by officers of Tacoma's Todd Pacific shipyard. The company is recruiting for labor in all the Pacific Coast states and present contracts call for 2000 additional skilled workmen. Word from the Navy states no reduction in the present program of navy construction is contemplated in the Pacific Northwest area.

Coast repair plants are booked to capacity and the situation will be more acute when a large fleet of merchant ships, released from the Atlantic comes to this coast to augment the supply line operating to the South Pacific. A. F. Hardy, state manpower director, has appealed to labor to remain on the job, adding that 7969 additional workers are needed in the area in industries vital to the prosecution of the war.

In his report to stockholders, C. L. Egtvedt, chairman of Boeing Airplane Co., outlined the company's conception of a sound postwar aircraft program. It includes (1) A minimum of at least two preliminary design studies for each type of aircraft, including research required in connection with such studies. (2) Construction of one or more experimental models of each type of aircraft selected as a result of previous preliminary design studies. (3) Production of the latest model aircraft of each type in quantities sufficient to develop production techniques, to permit complete proving through group maneuvers under all service conditions, and to give the United States air superiority.

Boeing announcement states that more B-29 Superfortresses are being turned out at the Renton Boeing plant than in any other airplane factory.

HOW FLEET HAS GROWN: American merchant shipyards have built four ships for every prewar vessel we had. Our fleet of Victory, Liberty, C-type and other ships has reached an alltime high of 3500 dry cargo and 900 high-speed tankers. During 1944, these ships moved more than 72 per cent of the 78,500,000 cargo tons shipped from the United States

WING TIPS

Liberty ships equipped with heavy metalworking equipment and are transformed into floating repair units to service Superfortresses in Pacific area. Work to tolerances of .0001 of an inch. Speeds maintenance of B-29s

AIRPLANE metal work of all kinds now is being performed at sea in Liberty ships converted by Air Technical Service Command into floating B-29 repair shops. A number of these vessels are now anchored off the Marianas, where they perform "fourth echelon maintenance," or complete and heavy overhaul of aircraft accessories requiring special tools and personnel with special training.

The 440-foot Liberty ships are fitted with machine shops, facilities for electric and acetylene welding, sheet metal work, heat treating, and electro-plating; they also are equipped for the repair of carburetors, turbo-superchargers, instruments, electrical equipment, and other components of the giant planes.

Purpose is to provide maintenance as soon as air strips in a newly-taken area have been completed, thus saving the two-to-six-month period normally required to set up comparable installations ashore. When shore installations are functioning fully, the "Aircraft Repair Units (Floating,)" which is the formal name of the new organizations, may haul up anchor and proceed to a more advanced destination, where they start their work all over again.

An unusual feature of the floating air depots is the flight deck, constructed of a special nonskid steel, above the forward portion of the main deck, from which helicopters operate. The rotary wing craft are used to fly key personnel, small parts, and small tools between ship and shore. The vessels also carry "ducks," jeeps with trailers, and work boats; they are swung over the side by the ship's booms when required.

The unit's work has won the commendation of B-29 tactical organizations and has turned out a variety of work, from clips which hold a resistor in governor heads for B-29 Hamilton Standard propellers to gears for Seabee bulldozers. Work is organized for the manufacture of individual items, or small quantities of a given item, rather than for mass production, in accordance with the requirements of the outfits making use of the floating air depot's services.

The machine shop in the First Aircraft Repair Unit is equipped to work to tolerances of .0001 of an inch. It is equipped with the following heavy machinery: 1 geared-head engine lathe, 16-inch swing; 1 geared-head tool room lathe, 12-inch swing; 1 screw-cutting bench lathe, 8 ½-inch swing; 1 floor type high speed radial drill with 24-inch capacity; 1 universal high speed horizontal milling machine; 1 universal metal shaper, with 24-inch stroke; 1 power hack saw; various drill presses and grinders.

Machinists aboard the vessel often have trouble centering work in lathes when out at sea, as they did on the voyage across the Pacific. Most work, however, is done in a harbor or anchorage, and this is therefore no problem.

A "former", or electrically driven hammer for turning flanges and performing similar work, is the most interesting piece of equipment in the sheet metal shop. It saves many hours of hand work daily and eliminates the need of making wooden forms on which ribs and other irregularly shaped pieces of sheet are hammered out. The former is not normally found in AAF maintenance units in the field.

Members of the sheet metal department may move their hand tools ashore to work on the B-29s themselves. This becomes a necessity when flak holes in wings and stabilizers have to be patched, because these assemblies are too big to fit into the Liberty ship hatches.

Large supplies of bar stock, sheet metal, and similar materials are carried in the holds of the vessel. Because of the distance from the mainland, scraps are saved; efforts are made to find a use for them, when possible. One floating air depot ran out of metal stock but found a supply in a nearby wrecked Japanese sugar refinery. Welders cut I-beams and other pieces of metal from the bomb-blasted mill; back at the ship the rust was cut off, and the steel was found to be a life saver.

On the trip to the Marianas, metal workers made themselves useful. They constructed a shop on the deck for the carburetor repairmen, who found that their cubicle below decks was unsuitable. Fuel fumes quickly filled their original department, and made work impossible. The new site provided adequate ventilation. They also built a supercharger shop on deck, after men who worked near the supercharger specialists in one of the holds complained of the noise caused by the spinning of the rotor mechanism during balancing. The two shops were made of sheet, welded in place. Members of the vessel's paint-dope-and-fabric shop put on the finishing touches.

Personnel for the ship were specially sifted by ATSC to find the best possible mechanics, who were later sent to schools for advanced training in their specialties.

Machine shop aboard a Liberty ship houses a floating aircraft repair unit developed by the Air Technical Service Command to provide heavy maintenance facilities for B-29s based in the Marianas. Men in the background work at lathes; man on the left uses a drill press; table and head of a radial drill are shown in foreground

Aviation War Conference To Be Held in Los Angeles

An Aviation War Conference of the American Society of Mechanical Engineers to be held June 11 to 14 at the University of California at Los Angeles,

BAR-STOCK TO FINISHED PART

18-8 STAINLESS... 30% BETTER TOOL LIFE

SUNICUT...

Keeps Small Tools Working Longer, Produces Better Finish

An eastern manufacturer was turning out 18-8 stainless-steel eye-terminals for the Navy on a Simmons Micro-Speed No. 2 Turret Lathe . . . cut-off and shape, rough turn, form, spot drill, drill, ream, and circular-form turn.

The material was 1" round annealed bar-stock, cut at a speed of 130 s.f.p.m. and spindle speed of 500 r.p.m. All tools were high-speed steel, except the rough turn and form tools which were carbide-tipped.

Short tool life . . . and poor finish, which necessitated hand-filing, were a problem, until a Sun Cutting Oil Engineer was called in, studied the different operations, and recommended Sunicut. With this transparent, sulphurized cutting lubricant, tool life has increased 25% to 30%; finish is now excellent; the hand-filing has been eliminated. Reamers now last 600 hours; forming tools average 280 hours.

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will bring together in the four evening sessions of the program some of Southern California's outstanding technical men in the aircraft industry. New aircraft techniques and a projection of postwar plans for the industry will be discussed in 38 papers at 16 separate meetings. The conference is under auspices of the Southern California Section of the ASME.

Dr. Clarence A. Dykstra, provost of the University of California at Los Angeles, will address the opening session Monday evening, June 11. The society and the university are co-operating in a conference as a contribution to the war effort.

Following Dr. Dykstra's address there will be two papers on gas turbines and jet propulsion, both illustrated by films. M. J. Zucrow, executive engineer, Aerojet Engineering Corp., Azusa, Calif., will discuss "Jet Propulsion Principles and Rockets for Assisted Take-off." Col. Homer Boushey, commanding officer, 412th Fighter Group, Bakersfield Army Air Field, Bakersfield, Calif., will speak on "Jet Propelled Airplanes."

The meetings on Tuesday evening will be devoted to heat transfer, standards and quality control, rubber and plastics, instruments and regulators, and applied mechanics.

A second heat transfer session will be held Wednesday evening, simultaneously with sessions on management, production, metals engineering and a second meeting on gas turbines and jet propulsion.

On Thursday evening, concluding sessions will take up heat transfer, production, hydraulics, applied mechanics and power plants.

Recasting of Fisher Body Plants Being Considered

A rather complete recasting of Fisher Body plants is in the works, and all details have not yet been released. For one thing, the Fisher Lansing plant will produce the bodies for interim Cadillac models, according to present plans, since the Fleetwood plant in Detroit is not readily available. Further, the Fisher No. 2 plant in Flint, source for Chevrolet bodies, is being taken over by Chevrolet, indicating the likelihood of a new Fisher plant in that city. Two new Fisher stamping plants, in Hamilton and Columbus, O., already have been announced, and there will be a concentration of Chevrolet body assembly operations in the No. 1 Cleveland plant as soon as the B-29 engine nacelle job can be moved out, with the No. 2 Cleveland or Memphis, Tenn., Fisher plants possible destinations.

Just recently announced is a new five-unit plant which Chevrolet and Fisher Body will build at Flint, providing 1,100,000 square feet of floor space, presumably for manufacture of the proposed lighter-weight lower-cost Chevrolet to be introduced to meet the competition of the light-weight economy Ford model (which now seems fairly certain to have the new 5-cylinder in-line Ford engine under tests for the past four or five years). The new Chevrolet manufacturing project in Flint will have capacity for production of 600 cars per 8-hour day, and will include an engine plant, body shop, power house test track and other facilities.

10,000 Corsair Fighters Produced in Three Years

Ten thousand Corsair fighters have rolled from assembly lines for service with the U. S. Navy, U. S. Marine Corps or the Royal Navy since the gull-winged F4U, fastest shipboard fighter in the world, was placed in production three years ago.

Of this total, more than 6000 were produced by the Chance Vought Aircraft Division of United Aircraft Corp., designer of the Corsair, and more than 3000 by the Goodyear Aircraft Corp., Akron, a licensee. The remainder, 735 airplanes, was built by Brewster Aeronautical, Long Island City, N. Y. and Johnsville, Pa.

Only Vought and Goodyear are currently producing Corsairs, the Brewster contract having been terminated more than a year ago.

Continual design improvements have brought increases in performance and armament to keep the Corsair in the forefront among the world's most versatile fighters. To its original armament of six .50 caliber machine guns have been added a 2000-pound bomb load and the devastating firepower of eight 5-inch rockets launched from racks under the wings. Also, certain Corsair models carry four 20-millimeter cannon in place of the machine guns.

PINBALL MACHINE GOES TO WAR: Boeing Aircraft Co. production engineers are using part of the mechanism of a pinball machine to check automatically the continuity of B-29 wire connectors. Some of the Superfortress wiring harnesses contain as many as 52 separate wires which formerly were checked individually. This device permits speedier and more accurate tests

Maguire Industries Enter Powder Metallurgy Field

Maguire Industries Inc., Bridgeport, Conn., has entered the powder metallurgy field by cash acquisition of stock of the Ferrocart Corp. of America and the Micro Products Corp., both of Hastings-on-Hudson, N. Y.

Ferrocart produces parts from powdered metals, and Micro is a sales concern. A several hundred thousand dollar expansion program is planned.

Earl Patch, formerly associated with the Moraine Products Co., General Motors Corp.'s Powder Metallurgy Division, at Dayton, O., has joined Ferrocart and will set up a new division to produce powder metal parts for mechanical uses. Ferrocart's present output is largely for electronic equipment.

Russell Maguire, president, Maguire Industries, will be chairman of the boards of Ferrocart and Micro, and Harry Ford, one of the previous owners of Ferrocart and Micro, will continue as president of those two firms. There will be no changes in the operating personnel and the two companies will continue as separate corporate entities.

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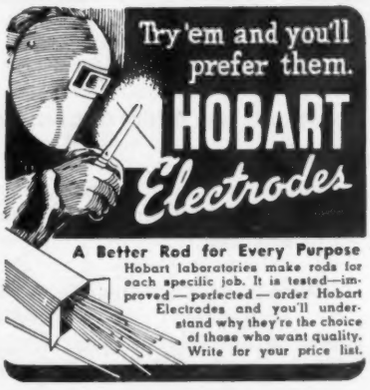
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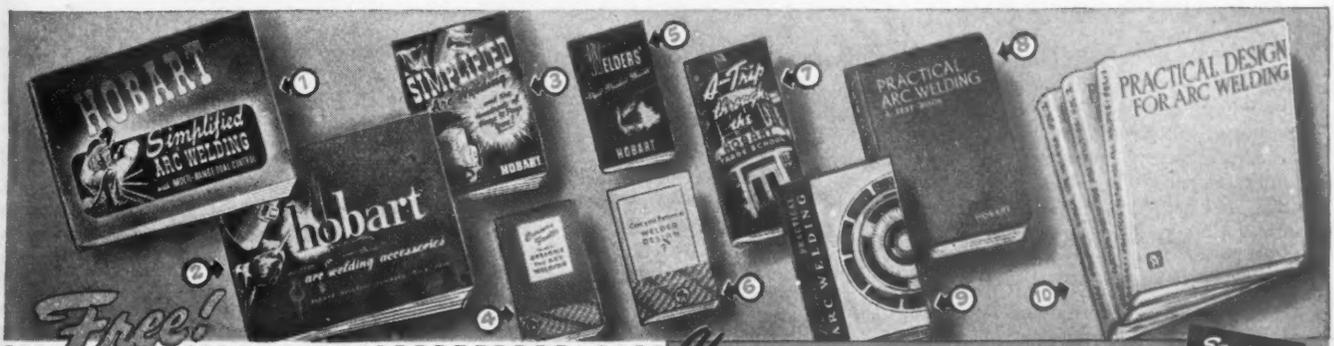

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Reynolds Metals Plans Aluminum Plant in Mexico

Sheet and plate will be produced when operations begin. Other fields of fabrication will be entered later

FIRST aluminum company to operate a plant in Mexico has been established by Reynolds Metals Co., Richmond, Va. The new company will be known as Reynolds Internacionale de Mexico and will be headed by R. S. Reynolds and his son, J. Louis Reynolds. The former, who is president of Reynolds Metals Co., will be chairman of Reynolds Internacionale, and the latter, a vice president of the American concern, will be president of the Mexican company.

Machinery and equipment is being shipped from the United States to Mexico for immediate installation as soon as the plant is constructed. The company will produce aluminum sheet and plate, and later it plans to enter other fields of aluminum fabrication, such as forgings, extrusions, rod, bar, cable, and powder and paste for paint. At the outset it will roll various kinds of foil, including foil made of aluminum, lead and tin, and will process such products by coloring, embossing and printing, for use as wrapping and packaging material.

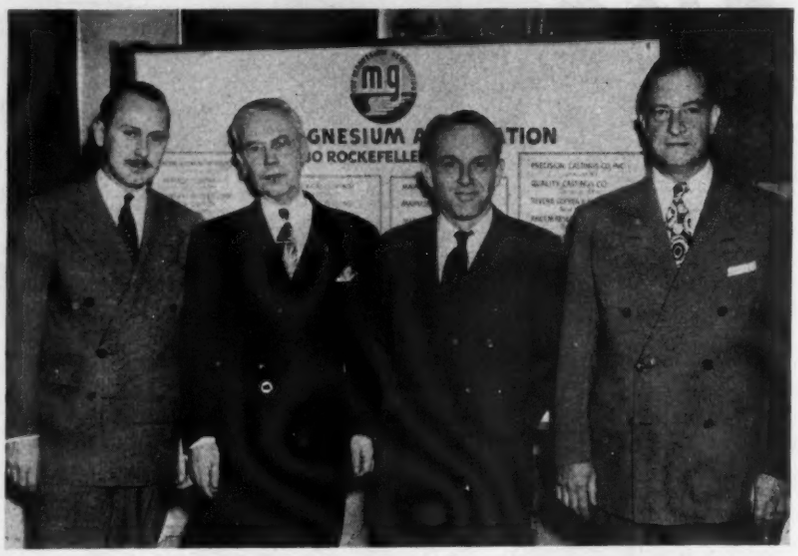
Manager of the Mexican plant will be Edwin Taranger, who has been in Mexico for the last two months.

Seventy-fifth Anniversary Observed by Zinc Company

Illinois Zinc Co., Chicago, is observing the seventy-fifth anniversary of its founding, James A. Hill, president, announced last week.

The company operates a sheet rolling mill in Peru, Ill., and a strip rolling mill in Chicago. Hull and boiler plates for the Navy, lithograph plates for printing battle maps, sheet zinc for lining powder boxes, and many other products which go into war materiel are produced by the firm. The dry cell battery program of the armed forces also relies heavily on the Illinois company for raw material.

Reconversion to peacetime production, Mr. Hill said, will present no difficulty, as the manufacture of war items has resulted in no great departure from peacetime practice. The company is anticipating a huge postwar demand, and will announce new zinc-base alloys when production curbs end.



Meeting of the Magnesium Association recently was held in New York. Shown above are, left to right, Edward S. Christiansen, president of the association and president, Magnesium Co. of America; Edward W. Rouse, chairman, Magnesium Development Committee, and assistant to the vice president, Revere Copper & Brass Inc.; Ralph J. Mowry, White Metal Rolling & Stamping Corp.; T. W. Atkins, executive vice president, Magnesium Association

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Montgomery Elevator Co., Moline, Ill., will form a subsidiary to operate in Mexico, Central America, and South America.

—o—

Calco Machinery Co., 1420 Chestnut street, Philadelphia 2, announces it is exclusive agent in the Philadelphia territory for vertical and toolroom universal milling machines produced by Reed-Prentice Corp., Worcester, Mass.

—o—

Thomas Prosser & Son, New York, importers and exporters of carbide tool grinders, mechanical specialties, and special steels, are observing the one hundredth anniversary of the founding of their firm.

—o—

Brooklyn Union Gas Co., Brooklyn, N. Y., will spend approximately $5 million in the coming year in expanding its gas manufacturing facilities by 20 million cubic feet.

—o—

U. S. Maritime Commission, Washington, will accept bids until noon, June 18, for construction of three refrigerated cargo ships for United Fruit Steamship Corp.

—o—

Susquehanna Wire Rope Co. has been established at Sunbury, Pa., to make wire rope and cable.

—o—

Waterbury Tool Division of Vickers Inc., Waterbury, Conn., will reduce operations from July 1 to July 14, inclusive, for an annual vacation period.

—o—

Spriesch Tool Co., Buffalo, plans to make automotive assemblies, vending machines, and other products after the war, Joseph J. Cheney, president, announced recently.

—o—

Great Lakes Transit Corp., Buffalo, has announced that stockholders have approved sale of the firm's four vessels, FRED W. SARGENT, ALFRED H. SMITH, GEORGE D. DIXSON, and UTICA, to a shipping company in Valparaiso, Chile, for approximately $1,735,000. Name of the buyer was not disclosed.

—o—

Whiting Corp., Harvey, Ill., has established a $25,000 scholarship fund at Illinois Institute of Technology to help meet the postwar need for trained engineers.

—o—

Poulsen & Nardon Inc., Los Angeles, machine, stamping, and die plant, has been purchased by Solomon Eisenrod, president, Lincoln Machine Co. Inc.,

Pawtucket, R. I. C. J. Nardon will remain as general manager of the Los Angeles plant.

—o—

Porcelain Steels Inc., Cleveland, has been reorganized and will be known as Republic Steel Co., Porcelain Steel Division. Don D. Smith is president and treasurer.

—o—

Jessop Steel Co., Washington, Pa., has received a clearance of renegotiation proceedings for 1944 from the War Contracts Price Adjustment Board, Washington, and no refund was due the government.

—o—

National Forge & Ordnance Co., Irvine, Pa., has issued an illustrated booklet describing operations of its modern forging plant.

—o—

Lincoln Electric Co., Cleveland, producer of arc welding equipment, has received preliminary details on what is believed to be the first all-welded hospital building in the United States. The 18-story structure is to be erected at Rochester, Minn.

—o—

Process Research Inc., Cincinnati, has received Ohio incorporation papers. Incorporators, all of Cincinnati, are Charles Beltzhoover, president of Beltzhoover Electric Co.; Aldon M. Kinney, president of A. M. Kinney Co.; and James Coombe, president of William Powell Co. The new firm will direct study of industrial processes as a step prior to plant design.

—o—

Benge Associates, Chicago, announced that the third Benge sales personnel clinic will be held June 23-30 at New Ocean House, Swampscott, Mass., under direction of Eugene J. Benge, president of the organization.

—o—

Monsanto Chemical Co., St. Louis, disclosed that it has begun volume production of Styramic HT, a new thermoplastic with electrical insulating properties, after six years of research conducted at request of the armed services.

—o—

United States Rubber Co., New York, has developed a tough new form of synthetic rubber to seal brass shell cases to steel projectiles in the manufacture of 40-millimeter ammunition.

—o—

Metal & Thermit Corp., New York, announced a new arc welding electrode, "Murex Type HTS." It is a mineral-coated electrode with less penetrating arc than "hot rods."

—o—

Colonial Bushings Inc., Detroit, has moved to 21601 Hoover road. The firm will carry an expanded line of standard drill jig bushings in stock for immediate shipment.

—o—

Mechanite Metal Corp., New Rochelle, N. Y., has concluded a contract with Kelvinator Australia Ltd., Adelaide, South Australia. The latter firm is a subsidiary of Nash-Kelvinator Corp., Detroit, and is making similar machinery and refrigerators.

—o—

Lempco-International Inc., Cleveland, will distribute Neapco universal joints and parts to all countries outside the United States, except Canada. The Neapco line is manufactured by New England Auto Parts Corp., Pottstown, Pa.

—o—

Overly Mfg. Co., Greensburg, Pa., has acquired Kiromac Mfg. Co., Richmond, Ind. Both firms make metal-clad doors, fire doors, door frames, skylights, ventilators and similar architectural sheet metal products.

—o—

L. W. Brant Foundry & Sheet Metal Works, Danville, Ill., has dissolved partnership, with L. W. Brant retiring after being identified with the firm 46 years. The business is now managed by the fourth generation.

—o—

American Committee, International Chamber of Commerce, will meet in New York, June 14, to prepare for the expected prompt revival of foreign trade.

—o—

Remington Rand Inc., Buffalo, has compiled "Management Controller No. 709" devoted to case histories of records used by many corporations in handling problems of employe seniority.

—o—

Instrument Society of America has been organized to advance the arts and sciences connected with the theory, design, manufacture, and use of instruments. The society's temporary office is located at 1117 Wolfendale street, Pittsburgh 12.

Purchasing Agents' National Group Elects New President

Charles L. Sheldon, purchasing agent, Hood Rubber Co., a division of B. F. Goodrich Co., Watertown, Mass., has been elected president of the National Association of Purchasing Agents for 1945-1946. He succeeds Robert C. Swanton, purchasing agent, Winchester Repeating Arms Co., New Haven, Conn.

Mr. Sheldon is consultant in the Office of Rubber Director of the War Production Board. From October, 1941, to April, 1943, he was loaned by his company to the Containers Division of WPB. Much of that time he directed that division.

Serving with Mr. Sheldon as members of the new executive committee of NAPA will be Mr. Swanton, the past president, and the following nine district vice presidents: George W. Aljian, California & Hawaiian Sugar Refining Corp. Ltd., San Francisco; O. D. Story, Shell Oil Co. Inc., Houston, Tex.; Roy F. Stiles, Stewart-Warner Corp., Chicago; Leslie E. J. Stonehouse, Westover-Kamm Co., Bay City, Mich.; William J. Mackay, A. F. Byers Construction Co. Ltd., Montreal, Canada; William F. Avery, Elwell-Parker Electric Co., Cleveland; W. S. Flinn, Simplicity System Co., Chattanooga, Tenn.; A. W. Zackey, Manganese Steel Forge Co., Philadelphia; and Everett A. Taylor, Providence Gas Co., Providence, R. I.

SIX MILLION ROUNDS: Brig. Gen. James Kirk, chief of the Small Arms Division of the Ordnance Department, presents John M. Olin, left, president of the United States Cartridge Co., St. Louis, and Spencer T. Olin, first vice president of the company, with the Army and Navy "E". Company has produced more than 6 million rounds of small arms ammunition

"Butterfly"

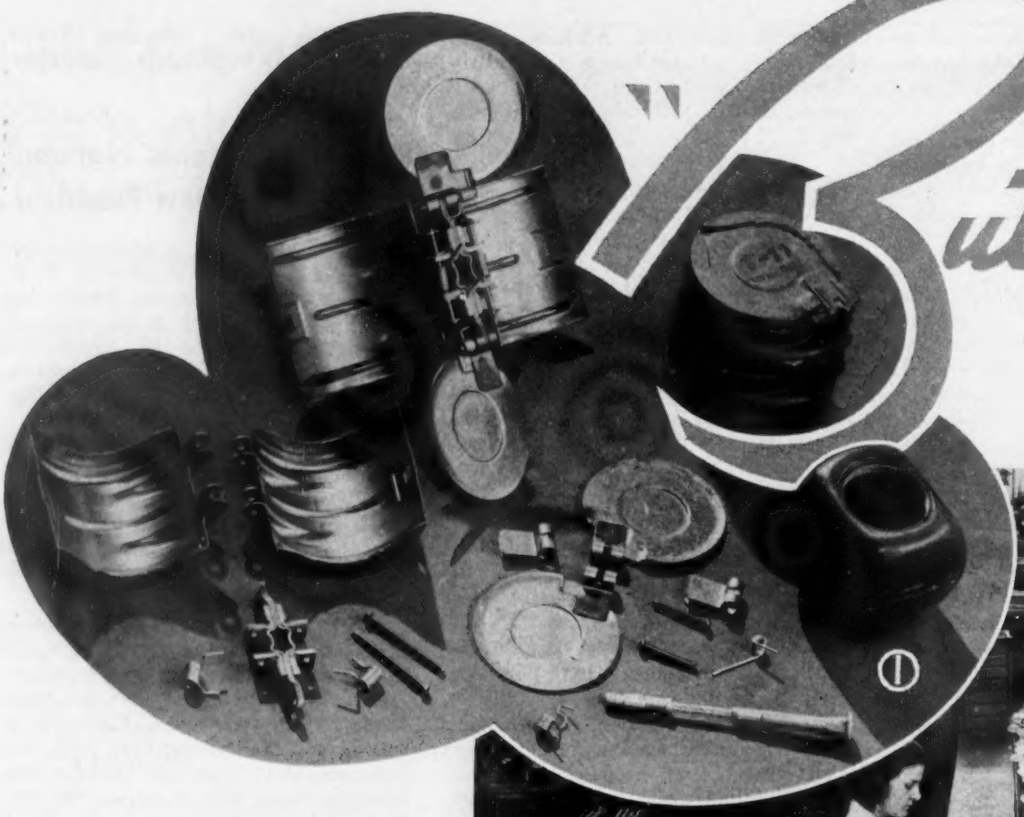


Fig. 1—Extreme right, bomb which is filled with explosive; upper right, bomb in case; upper left, open case, note springs and angle of "wings"; foreground, parts making up the assembly

Fig. 2—Assembly line starts at rear; finishes in foreground where operators are locking hinge pins by flattening ends in revamped wire cutters. Parts travel down line on belt conveyor in center of table

Fig. 3—Operator inserting preloaded spring in assembly. Circle shows closeup of head of tool employed to "wind up" and insert spring in assembly under tension desired

Fig. 4—Wings are added at these two stations. Actuating springs are also preloaded here by same method as in Fig. 3. Belt conveyor moves parts along assembly line

Case

Ingenious jigs and fixtures are devised at Geometric Stamping Co., Cleveland, to facilitate assembly operations in production of unique bomb containers; springs are preloaded before assembly

By G. W. BIRDSALL
Associate Editor, STEEL

MANY contributions have been made to the war effort by sheet steel stampings because they are so easily produced in huge quantities. Perhaps one of the most interesting sheet metal assemblies used in bombs is found in the "butterfly" case for the 4-lb. fragmentation bomb.

This case derives its "butterfly" name from the fact that when the individual bombs are released by bursting of the large case in which a quantity of them are dropped from a plane, the individual containers fly open to cause the bombs to flutter down in a fairly slow descent. The purpose is to allow air currents to disperse the bombs over as large an area as possible, thus exerting maximum effectiveness against personnel when they explode.

Main cylindrical cover is split into two sections which are held open by strong springs. The two end pieces or wings also are hinged to the common "backbone" and held open by two more springs. As the case opens, the thick walled cast iron bomb itself is suspended from a short cable. The covers are seen at lower left, Fig. 1; the backbone at extreme lower left; the end pieces or "wings" in center foreground, with the suspension cable at right foreground. Completely assembled case is at upper left, with a closed case at the upper right. At extreme right is the thick-walled cast-iron bomb itself which is filled with explosive and fitted with a fuse to explode within the target area.

Improvements in the original design of the elements of this case have permitted considerable economies in production. For example, the two end pieces or wings were originally made separate from the hinges which were later spot welded to the wings. Now the wing and hinge is made in one piece.

Eliminate Four Stampings

The backbone originally was made from six stampings riveted together. Now this part is made from two stampings fastened together in a simple press operation. The two sections of the cover, the two wings and the backbone are made by blanking and forming 16-gage sheet steel.

Fig. 2 shows main portion of a 60-ft. table served by a 12-in. wide canvas conveyor belt, on which the assembly and inspection operations are conducted. The belt is driven by a ¾-hp. motor at various speeds. Rate of travel for this assembly job is about 8 ft. per minute.

At start of the line, extreme rear, Fig. 2, the stamped parts are fed from bins to convenient pickup points where the girls begin the assembly. First operation on this fragmentation bomb container is to assemble the cover sections to the backbone.

Fig. 3 shows closeup of this operation. The two sections of the cover are first positioned in the fixture, then the backbone is put in place. Now comes a

tricky little operation: The springs that hold the cover open are preloaded before assembly. This is done by use of the three pins at the lower left in Fig. 3 and the special loading tool shown in the circle, Fig. 3A.

The spring is placed over the pins in such a way that the loading tool can be hooked over the spring with one end of the spring anchored in the pins and then the tool is turned to load the spring and the other end of the spring engaged by the tool. While thus held under tension, the spring is slipped off of the pins and positioned in the assembly.

As it is held in place, Fig. 3, the operator lays one of the hinge pins on the fixture and drives it through the assembly by pushing the handle extending at the right foreground. Now the operator twists the spring-holding tool to disengage the spring which then holds the cover section open under the desired tension.

Since the entire fixture is of the turntable type, the operator can quickly swing it around to repeat the complete operation on the other cover section. From this fixture, operator places the assembly on the conveyor belt which carries it on to the next operation. For this first operation, just described, there are four duplicate stations, two on each side of the belt conveyor in the extreme rear of Fig. 2.

Wings Added Next

Second assembly operation, pictured in Fig. 4, consists in adding the wings. Here also four work stations are required, two on each side of the belt conveyor. Cover assemblies with and without the wings attached can be seen on the conveyor in Fig. 4. Turntable jigs are also provided for this assembly. The operator inserts two springs, then puts the wings in place, using two long rivets or hinge pins. Springs are preloaded in assembly using the same system described in attaching the cover sections.

Passing on to the third operation, a station on each side of the belt is employed to close the container, check the springs and insert a safety fastener. The open assembly is placed on top of a jig which roughly resembles a hollow rectangular block. A rod which comes up from underneath the table engages the assembly and when actuated by a foot treadle pulls the assembly down into the fixture, closing the covers and wings. The assembly is pulled down and released twice to check operation of the springs.

When proper operation has thus been checked, the assembly is pulled down in the fixture and a U-shaped wire clip is inserted in the cover sections where they come together, locking the unit in the closed position. As shown in Fig. 5, the closed assemblies then are put back on the conveyor belt. These two stations are the last ones on the conveyor and can be seen in the foreground of Fig. 2.

Fourth Operation Swaging Pins

Fourth operation is the swaging or expanding of the ends of the four hinge pins. These pins are headed at one end before insertion into the assembly. To lock them in place, the other end is flattened out using revamped wire cutters fitted with small anvils at the jaw tips and mounted on a bench fixture so they can be actuated through a foot treadle. This arrangement, shown in Fig. 6, allows the operator to use both hands for positioning the work. There are two of these stations on opposite sides of the conveyor belt as shown in immediate foreground of Fig. 2.

Final operation is inspection before the containers go to the finishing department for painting.

All the jigs and fixtures for assembly, as well as inspection fixtures provided at two points along the conveyor, were designed and built by engineers of Geometric Stamping Co., Cleveland, O.

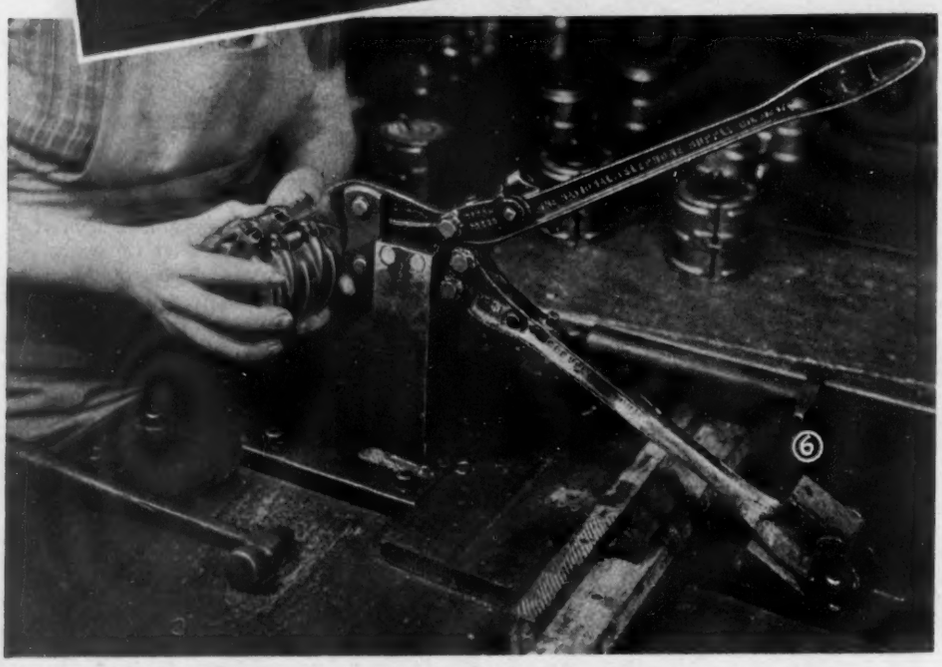


Fig. 5—In this fixture, operation of the spring actuated covers and wings is checked by pulling down into box-like fixture and the assembly locked in the closed position by inserting clips as shown

Fig. 6—Pins are locked in place by flattening ends in revamped wire cutters fitted with small anvils instead of cutting tips. All photos from Geometric Stamping Co., Cleveland

Back-Pack OXYACETYLENE CUTTING OUTFIT

. . . developed to speed repair of Navy's battle-damaged ships, may find many postwar industrial applications. Light weight of portable pack permits operator to carry it through narrow passages

OXYACETYLENE emergency cutting outfit recently developed for use under battle-damage conditions weighs only 56 lb and is contained in a fire resistant canvas back pack. It can be carried and operated by one man, permitting him to crawl through narrow passages, cutting his way, if necessary, as he goes. Improvement over earlier equipment, weighing almost 200 lb and requiring at least two crewmen to handle it, is obvious.

This pack-type emergency cutting outfit has proved so useful that similar portable equipment already is being made for municipal fire departments and it is expected that many industrial uses will be discovered for it in welding, as well as cutting.

After the North African invasion, some simplification in the design of oxyacetylene cutting equipment and increased portability was recommended to the Navy Bureau of Ships. A light, portable pack type outfit was developed, together with an aluminum locker to contain all of the apparatus, making it easy to remove from stowage and to prepare for operation.

The new pack type unit, of which there are 13,000 in service and on order, consists of two 22 cu ft capacity oxygen cylinders, one 10 cu ft capacity acetylene cylinder, gas regulators, a hand-cutting torch, hose, gloves, lighter, goggles, and tools. The two oxygen cylinders are connected by a manifold. Regulators are designed to control automatically the supply of gases to the cutting torch. All the operator must do before using the unit is open valves of the cylinders. The torch then is ready for action.

In cases where battle-damage has caused the jamming of compartment doors, or where twisted steel wreckage needs cutting away prior to repair work, a single operator with his portable cutting gear can cut his way into damaged spaces, making way for fire hoses and repair parties. Men trapped in compartments have been rescued by immediate use of the new equipment, and fires that might have caused severe damage have been reached quickly.

Another advantage of the new cutting outfit, shown in position, Fig. 1, is the provision for rapid replacement of the gas cylinders when they become empty. This is accomplished by arranging cylinders in sets, a unit consisting of two oxygen cylinders and one acetylene cylinder. Each unit has its individual oxygen manifold already attached to the cylinder valve outlets and the cylinder set clamped in an aluminum cradle. This makes the set a unit and facilitates rapid change-over. When a change of cylinders is necessary, it is necessary to remove only the oxygen and acetylene regulators, take the empty cylinder set from the pack and replace it with a fully charged set. The two regulators then are re-attached, and the equipment is ready for use. Gas capacity of one set or unit of cylinders will cut approximately 225 lineal in. of 1-in. steel plate.

Probability that the new emergency cutting outfit will be used by relatively untrained operators under battle-damage

(*Please turn to Page* 144)

SELECTING Gas Immersion Tubes

Data on design and applications of immersion tubes suitable for industrial heating purposes worked out by the Committee on Industrial Gas Research of the American Gas Association are presented along with complete information on determining heat output and other considerations of thermal efficiency

BASIC performance characteristics of gas immersion tubes have been under investigation for the past two years by the American Gas Association at its Cleveland testing laboratories through its Committee on Industrial Gas Research.

This method of gas heating has been adapted to numerous commercial and industrial heating processes with considerable success. However, a lack of published technical data on this subject has hindered to some extent a more rational and convenient approach to engineering such applications for predetermined heating requirements, and for high standards of thermal efficiency and any other performance characteristics required.

During this investigation certain definite empirical relationships involving heat transfer characteristics of gas immersion tubes and their physical dimensions were developed. These data, which are applicable to immersion tubes suitable for industrial heating purposes will be discussed in some detail.

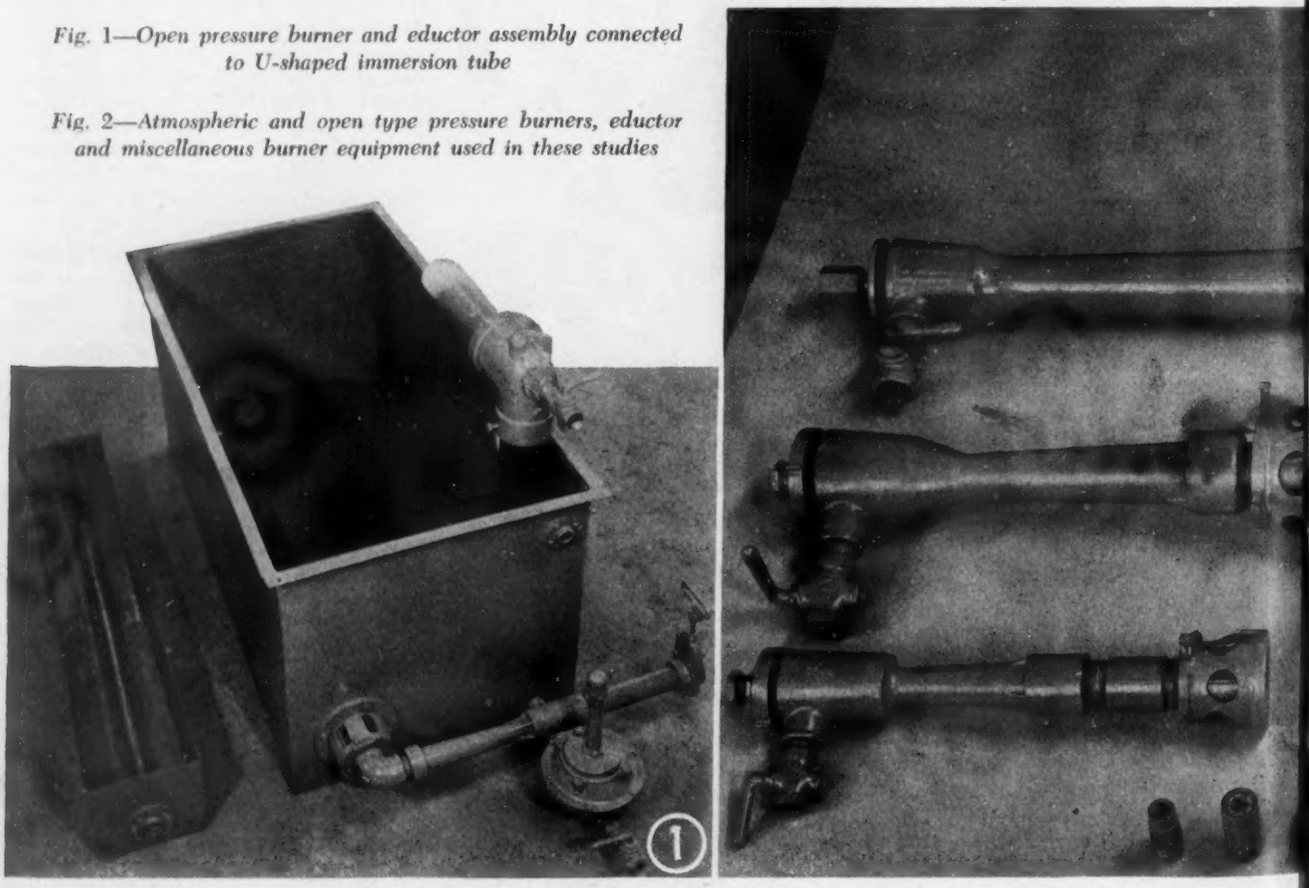
Large Gas Immersion Tubes

In any installation of industrial gas immersion tubes there are generally two primary design considerations which must be given appropriate attention. The more important of these is probably the requirement that the gas burning capacity and heat transfer characteristics of the immersion tube should be such as to bring the heated medium up to temperature within a desired time limit and to provide adequate pick-up or recuperation upon adding load. Coupled closely with this requirement is the necessity of performing the work economically insofar as gas consumption is concerned. In other words, reasonably high heat transfer rates and thermal efficiency should be attained. Collateral considerations in the design and installation of industrial gas immersion tubes are that they should operate without excessive noise, that combustion should be complete, that the diameter of the tube should be adequate for the designed gas rate, and that the temperature and safety control equipment should function properly to insure safe performance and satisfactory recuperation under variable load conditions.

Fortunately, all capacity and thermal efficiency data obtained during this investigation could be closely correlated by a single relationship, involving only the length of the immersion tube (water-

Fig. 1—Open pressure burner and eductor assembly connected to U-shaped immersion tube

Fig. 2—Atmospheric and open type pressure burners, eductor and miscellaneous burner equipment used in these studies



backed) and the input rate. It may be expressed as:

$$E = 20 \log \left(\frac{L^2}{R} \right) \text{ plus } 71 \quad \ldots\ldots (1)$$

Where:

E = thermal efficiency, per cent
L = effective length of tube, feet
R = input rate, 1000 British thermal units per hour

The effective length L includes the straight length of pipe and 1.1 feet for each 90 degree elbow or return bend plus the length of the fitting at its centerline in feet. As will be noted, the diameter of the pipe can be neglected insofar as thermal efficiency is concerned.

On the basis of equation (1), recommended data in Table I were assembled. These are premised on the assumption that the immersion tube designer would have calculated the required hourly heat output from the tube or, as a corollary, the required hourly heat input into the medium being heated. Hence, length of immersion tube necessary for a predetermined heating requirement is given in Table I, and is related to efficiency of heat transfer expected and the appropriate gas input rate.

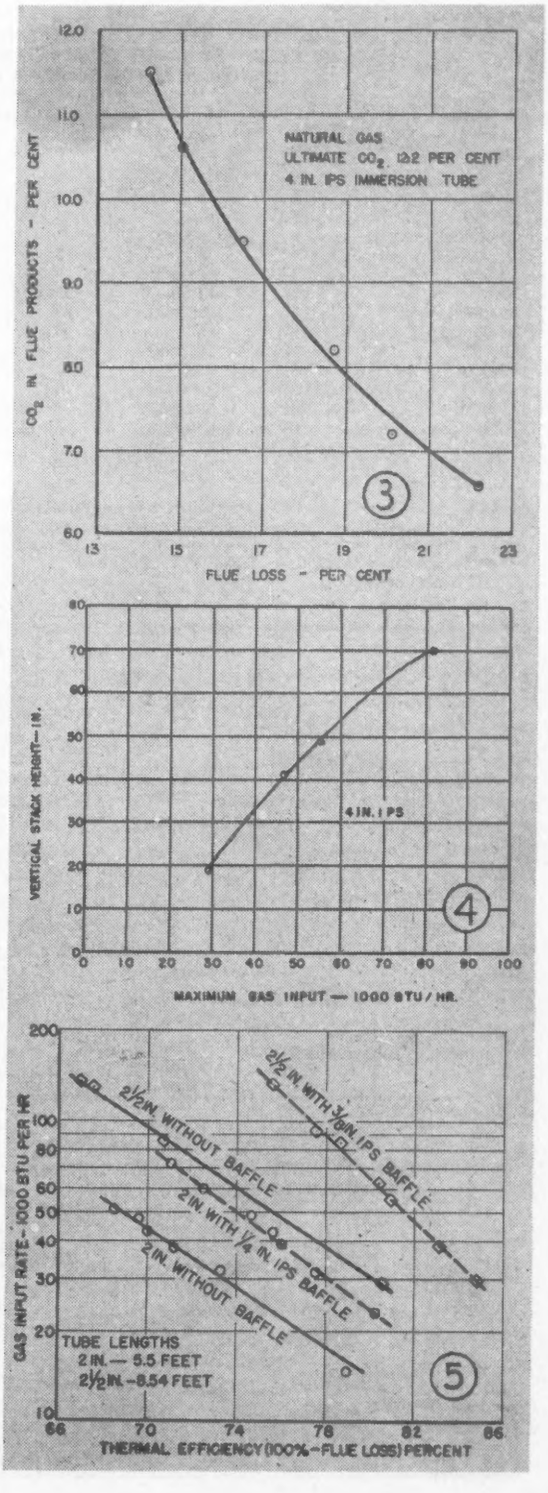
Recommendations presented in Table I have been verified for nominal tube diameters of ¾ to 6 in. and effective lengths from about 4½ to 45 ft. While there is reason to believe that extrapolation could be made to extend the applicability of this equation to larger tube sizes and longer tube lengths, this procedure is not recommended if close accuracy is desired. However, if larger diameters or longer lengths than those employed in this research are required, equation (1) can be used to advantage in estimating probable tube dimensional requirements for specific heating rates. In no case should the data be extrapolated to cover shorter lengths of tubes than the shortest employed (4½ ft).

Maximum gas input rates which may be attained with satisfactory combustion in immersion tubes depends principally on type of burner installed. Several of the burners employed in this investigation are illustrated in Fig. 2. When sufficient external energy is supplied with pressure or eductor burner systems, there is no reasonable limitation on the input rate per square inch of internal pipe surface area which can be reached. For this reason no attempt was made to evaluate quantitatively the various factors limiting gas input rates. However, a list of the maximum inputs employed in various tests is presented in Table II to provide a qualitative basis for estimating the range of input ratings that could be utilized with different type of burners. For open pressure type burners in 2½ and 4-in. tubes, the in-

Fig. 3—Relation of flue loss in gas immersion tube heating to concentration of carbon dioxide in the flue gases

Fig. 4—Effect of stack height on maximum input obtainable with the atmospheric immersion tube burners

Fig. 5—Effect of baffles on thermal efficiencies of the 2 and 2½-in. IPS immersion tubes


NATURAL GAS
ULTIMATE CO_2 12.2 PER CENT
4 IN. IPS IMMERSION TUBE
CO_2 IN FLUE PRODUCTS - PER CENT
FLUE LOSS - PER CENT
3
VERTICAL STACK HEIGHT—IN.
4 IN. I PS
MAXIMUM GAS INPUT — 1000 BTU / HR.
4
GAS INPUT RATE - 1000 BTU PER HR
2½ IN. WITH 3/16 IN. IPS BAFFLE
2½ IN. WITHOUT BAFFLE
2 IN. WITH ¼ IN. IPS BAFFLE
2 IN. WITHOUT BAFFLE
TUBE LENGTHS
2 IN. — 5.5 FEET
2½ IN. — 8.54 FEET
5
THERMAL EFFICIENCY (100% - FLUE LOSS) PERCENT

put rates tabulated approached closely the maximum that could be employed without excessive heat loss at the entrance of the tube.

The greatly increased input rating that can be attained by the use of a sealed-in type pressure burner is illustrated by the comparative ratings obtained in a 2-in. tube (279,000 versus 52,100 Btu per hour with the open type pressure burner). Likewise, the high rate with the pressure burner was obtained with an extremely long tube (over 40 ft); whereas, the 2-in. tube with which the input rate of 52,100 Btu per hour was finally attained with the open type of presure burner was only 5½ ft. long.

Similar increase in input rating also may be obtained by the use of eductors attached to the outlet of the immersion tube as shown in Fig. 1. The extent to which input rate may be increased depends on available air pressure and capacity and venturi size and design. An indication of the possibilities in this direction are revealed by data in Table II for 2.0 and 1.0 in. IPS. immersion tubes which were operated at relatively high inputs with a small vacuum. In order to attain these high inputs with satisfactory combustion it was necessary to provide enlarged combustion chambers consisting of short lengths of 4-in. pipe for both pipe sizes.

Atmospheric burners were found to have lower limitations on maximum rates. In Table II it will be noted that the 2½ and 4-in. tubes capacities of atmospheric burners were less than half that obtained with open type pressure burners, and this was possible only in tubes of relatively short length and with use of 7-ft vertical risers to provide adequate draft. Influence of stack height is shown quantitatively for a 4-in. immersion tube in Fig. 3. It is interesting to note that an increase in height of vertical riser of from 20 to 70 in. permitted the maximum input rate consistent with good combustion to be increased from 30,000 to 80,000 Btu per hr.

Riser Height May Be Adjusted

In this range of vertical riser or stack height the permissible increase in input rate per foot of stack height was 12,000 Btu per hr, maintaining the length of immersion tube at a constant value. This drastic effect of change in riser height on maximum permissible input rate prompts the observation that selection of required pipe diameter for a given input rate need not be rigorous since tube capacity can be readily and substantially increased if necessary by the simple expedient of appropriately adjusting riser height.

During this investigation gas rates at atmospheric pressures slightly in excess of 10,000 Btu per hr per square inch of cross-sectional tube area were completely burned with a tube length of 5.5 ft and a vertical riser of 7 ft. With a tube length of 10½ ft and vertical riser of 7 ft, approximately 7500 Btu per hr per square inch of cross-sectional area was completely consumed. It may be noted, however, that it should be possible to employ input rates per square inch of cross-sectional area with atmospheric burners that follow the relationship:

$$5000\sqrt{\frac{10}{L}}$$

Where:

L = effective length of tube, feet

This relationship will give conservative values which can be safely exceeded in most instances, particularly if more than 7 ft of vertical stack is to be employed.

With open type pressure burners considerably higher, input rates per square inch of cross-sectional area can be employed. With this type of burner equipment, input rates following the relationship

$$15{,}000\sqrt{\frac{10}{L}}$$

should be readily attainable with complete combustion. Higher rates may lead to excessive burner cage temperatures

(*Please turn to Page* 146)

TABLE I

RECOMMENDED IMMERSION TUBE LENGTHS* FOR REQUIRED OUTPUT RATES AT PREDETERMINED THERMAL EFFICIENCIES

Output Rate Btu per Hr.	Effective Length of Immersion Tube Required at Predetermined Thermal Efficiency—Ft†					
	Thermal Efficiency and Required Input Rate					
	60%	Input Rate Btu/Hr.	70%	Input Rate Btu/Hr.	80%	Input Rate Btu/Hr.
10,000	2	17,000	3½	14,000	6	12,500
20,000	3	33,000	5	29,000	8½	25,000
30,000	4	50,000	6	43,000	10½	37,500
40,000	4	67,000	7	57,000	12	50,000
50,000	5	83,000	8	71,000	13½	62,500
60,000	5	100,000	8½	86,000	14½	75,000
70,000	6	117,000	9½	100,000	15½	87,500
80,000	6	133,000	10	114,000	17	100,000
90,000	6½	150,000	10½	129,000	18	112,500
100,000	7	167,000	11½	143,000	19	125,000
125,000	8	208,000	12½	179,000	21	156,250
150,000	8½	250,000	14	214,000	23	187,500
175,000	9	292,000	15	250,000	25	218,500
200,000	10	333,000	16	286,000	26½	250,000
250,000	11	417,000	18	357,000	30	312,500
300,000	11½	500,000	19½	429,000	32½	375,000

*Each 90 degree elbow or return bend is equivalent to 1.1 ft of straight pipe plus the length of the fitting at its centerline in feet. All effective pipe lengths are water-backed surfaces. Pipe lengths extending beyond the heated medium such as burner cages are not included and must be added to lengths tabulated.

†To nearest ½-ft.

TABLE II

MAXIMUM INPUT RATES EMPLOYED ON VARIOUS SIZES OF IMMERSION TUBES

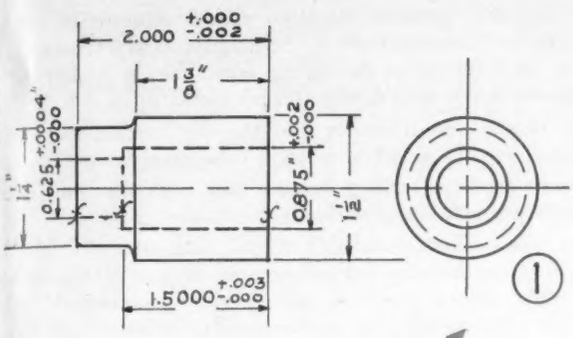
Pipe Diam. Nominal In.	Type of Burner	Length of Tube, Ft.	Maximum Input Btu/Hr	Flue Gas Temp. °F.	Burner Cage Temp. °F.
6	Open Pressure	15.0	311,000	995	190
5	Open Pressure	15.18	343,000	1,137	205
4	Open Pressure	14.7	191,000	886	336
4	Atmospheric*	6.41	82,300	1,060	
3	Open Pressure	10.58	150,500	988	151
3	Atmospheric*	10.62	57,600	749	
2-1/2	Open Pressure	9.82	136,400	1,068	322
2-1/2	Atmospheric*	5.92	51,300	1,093	
2	Open Pressure	5.5	52,100	1,011	119
2	Open Pressure 15 In. Vac.	11.04	135,500	853	
2	Sealed-In Pressure	42.77	279,000	201	101
1	Open Pressure 1.33 In. Vac.	11.27	46,200	256	380

*Maximum input rates for atmospheric type burners were obtained with 7 ft of vertical stack at immersion tube outlet.

TABLE III

COMPARISON OF HEAT OUTPUT AND THERMAL EFFICIENCY CHARACTERISTICS OF 4 SIZES OF IMMERSION TUBES AT VARIOUS INPUT RATINGS

Tube Size In. I.P.S.	Gas Input Rate—Btu/Hr/Sq. Ft. of Internal Tube Surface		
	80% Efficiency 400-500 F Flue Temperature	75% Efficiency 700-800 F Flue Temperature	70% Efficiency 900-1000 F Flue Temperature
2	4700	8500	15,000
2½	5200	8800	14,000
3	4500	8500	15,500
4	5000	8900	15,500
Average Input Btu/hr/sq ft	4850	8675	14,875
Average Output Btu/hr/sq ft	3880	6500	10,400



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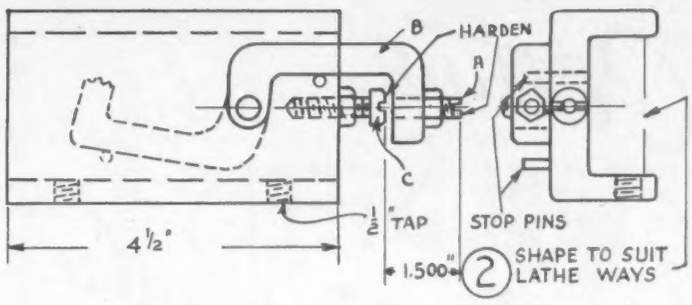


2 SHAPE TO SUIT LATHE WAYS

Lathe ATTACHMENTS

By ROBERT MAWSON
Providence, R. I.

. . . transform special machining job into production operation, thus permitting work formerly requiring highly skilled operators to be handled on simple repetitive basis

MANY small machine shops have found it necessary during the war to transform special machining jobs into production operations, because work formerly done by experienced machinists has to be performed by girls. A striking example of how this need of skilled help is being hurdled was demonstrated in a small shop visited recently. This plant had received an order to machine several thousand small bronze castings. A detail of this piece is shown in Fig. 1.

In order to meet the quoted price and to comply with the manufacturing requirements, this job is being done by a girl with the aid of special equipment to be described.

A pair of chuck jaws was machined to hold the 1 1/2-in. diameter piece, these jaws being made with a 1/4-in. projecting surface on their lower or inside end. The first set of operations, with the piece held in these chuck jaws, consists of facing the left end surface and boring the 0.625-in. hole. This hole is tested with a standard go and no-go plug gage.

In the second operation, position stops are used. For this work the casting again is placed in the same chuck jaws, but this time the piece is located for position against the projecting surfaces previously mentioned.

Referring to details in Fig. 1, it will be noticed that the important dimensions to be obtained in this second operation are the overall length, 0.875-in. deep hole, and the diameter of this hole. In order to obtain a low manufacturing cost, several attachments were made.

The attachment shown in Fig. 2 is fastened on the ways of the lathe at the rear of the chuck. The screw, A, then is adjusted so that, with the machining tool in the tool post and the left hand edge of the lathe carriage coming against this screw, the piece will be machined to length of 2 in.

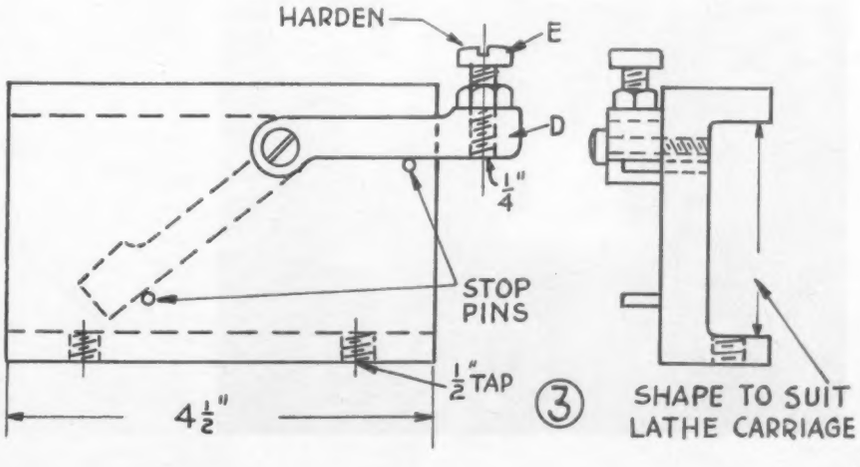
The attachment shown in Fig. 3 is fastened to the lathe carriage in front of the cross slide, screws being provided to hold the attachments in position, as may be seen in illustration.

However, when facing the casting to length, the arm D on the attachment in Fig. 3 is swung back to the position by the dotted lines. When boring the 0.875-in. hole, the arm B on the attachment in Fig. 2 is swung back to the position shown by the dotted lines and the depth or position stop is the end of the screw C, this stop having been set so that the 1.5-in. depth will be obtained. The arm D on the attachment in Fig. 3 also is swung to the position shown by the full lines and the position stop E set so that the machining tool will bore the hole to the proper diameter.

After these position stops are set and locked by means of their respective nuts, the operator rapidly can repeat the machining operations and obtain each time the desired dimensions. The only time it is necessary to adjust the settings is when the facing and boring tool needs regrinding. Such adjustments are made quickly.

Obviously, the design of these attachments must be made to conform to the particular type of lathe on which operations are to be performed. However, the basic principles can be applied successfully in connection with many machine tools.

With these attachments, an inexperienced operator can throw the arms to their proper positions and machine the piece quickly and easily. Thus, what with standard equipment would be a conventional machining job demanding a high grade operator, becomes a simple repetitive "mass production" operation through this application of tool engineering technique.



3

Casting TOOL STEELS Centrifugally

INCREASED interest has been shown recently in solid, cast high-speed cutting tools of the tungsten-cobalt type which can be used for many machining operations at higher cutting speeds and a considerably longer tool life.

One of the newest entries into the cast cutting tool field is Crobalt Inc., Ann Arbor, Mich. This company uses an indirect arc, rocking melting furnace and casts the tools centrifugally in molds approximately to finished size.

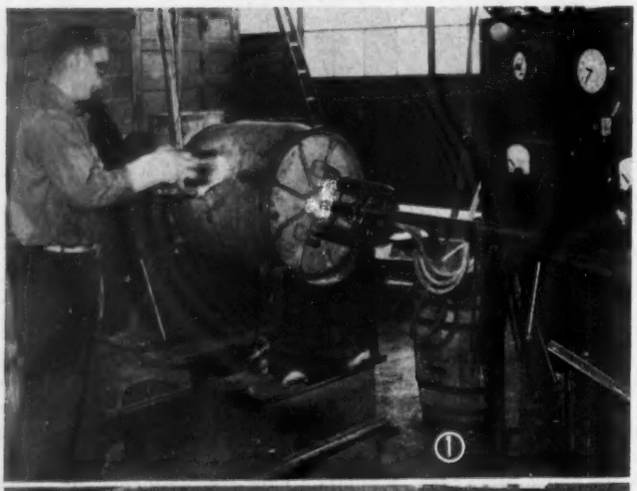
The furnace first is charged (Fig. 1) and after the heat is brought up to the required temperature of over 3000 degrees Fahr., the molten metal is poured into a preheated ladle (Fig. 2). The metal then is conveyed to a centrifugal casting machine (Fig. 3) and poured at a temperature of about 3000 degrees Fahr.

As will be noted by referring to Fig. 4, a dozen individual cutting tools are cast around the central pouring sprue. When the metal has cooled, the castings are removed from the hub and cut to proper length. Next, the tools in the rough are heated for one hour in an instrument-controlled electric furnace at a temperature of between 1000 and 1100 degrees Fahr. and quenched in oil. This same heat-treating procedure then is repeated.

Heat treatment increases hardness from approximately 63 rockwell C to between 66 and 70. Hardness is controlled so that tools can be produced with the desired characteristics for individual applications.

Following heat treatment, the castings are ground to finished size for use as standard tools or inserts in large, composite tools. The composition of these tools, designated as Powersteel, is 19.46 per cent tungsten, 3.86 chromium, 1.19 vanadium, 1.12 molybdenum, 10.08 cobalt, and balance iron. The process, which is covered by Patent No. 2195402, is said to give the metal a preferred grain and carbide particle size at the time of casting, thus eliminating forging and subsequent heat treatment.

According to Charles Baird, vice president in charge of development and product, the tools will retain their cutting ability on many types of work several times longer than previously had been considered possible, and cutting speeds can safely be increased by 20 per cent. These tools, however, are not regarded as being a cure-all for every kind of cutting job.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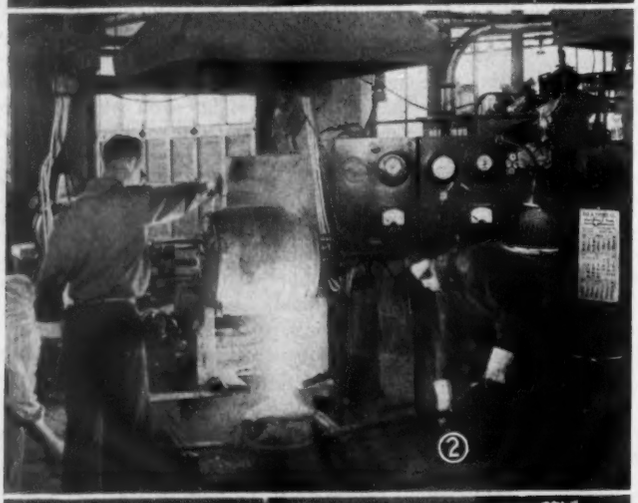
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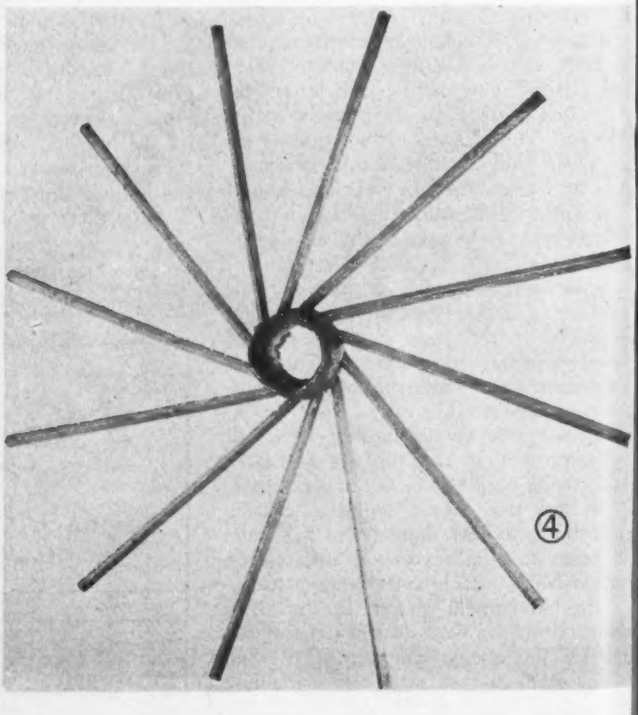
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CAST and FORGED STEELS Compared

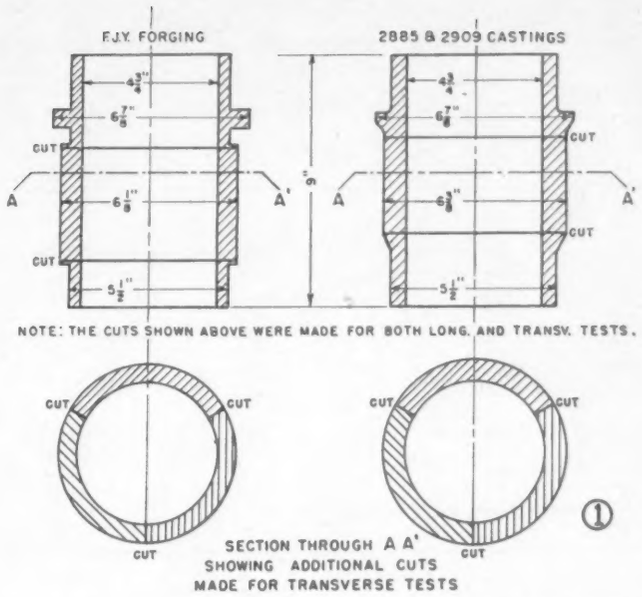


Fig. 1—Sketch of cylinder barrels

After making comparative study of physical properties of the two materials, Battelle Memorial Institute researchers conclude there is little to choose between forged and soundly cast steel parts. Limited forging of cast blanks sometimes effective

By C. E. SIMS
Battelle Memorial Institute
Columbus, O.

BEFORE aircraft were put into mass production, many steel parts were hogged out from solid steel stock. With the advent of mass production and assembly lines, these parts were redesigned, so far as possible, to be made as drop forgings, machine forgings, or hammer forgings. Many assemblies such as landing-gear parts were made by welding forgings together, forgings to tubing, etc. Such assemblies have been satisfactory in respect to service obtained.

Because of the tremendous wartime demand for forgings, however, there developed a shortage in forging-quality alloy steel, in forging machine capacity, in die block steel, and in tool makers. As a result, forgings were extremely hard to procure in a reasonable time, especially when changes in design required new die blocks. Some parts, moreover, were of such size and shape as to require complicated and expensive dies. Expense here is interpreted as manhours of labor rather than dollars.

One potential source of parts, and a means to break the bottleneck, was to substitute steel castings for forgings. The aircraft industry, on the whole, has had but little experience with steel castings, and the comparative properties of the two products were largely unknown. Individual aircraft manufacturers were taking steps independently to procure test castings, but, inasmuch as the problem is common to all producers, the subject was taken up with the War Production Board.

WPB placed a contract with Battelle Memorial Institute to do research work, fundamental testing, and development of test methods. This work was under the direct supervision of the War Metallurgy Committee and under the general guidance of a committee composed of metallurgists versed in steel casting and of individuals with a knowledge of aircraft requirements. This article is based on excerpts from the restricted Battelle report, serial No. W-154.

Forged and Cast Cylinder Barrels Compared: Early in the project, a request was made to compare the properties of forged and centrifugally cast aircraft engine cylinder barrels, especially in fatigue. Centrifugally cast barrels from two heats of steel and forged barrels from one heat of steel were procured in the rough machined condition. The compositions of the three heats are given in Table I.

All cylinders were heat treated according to current practice which consisted of quenching in oil from 1550° F and tempering back to a hardness of approximately 325 brinell. The barrels were then sectioned longitudinally and transversely as shown in Fig. 1 to obtain tensile and fatigue bars. Tensile bars were standard 0.505-in. bars with threaded grips, while the fatigue bars were of the rotating beam type for the R. R. Moore machine. Both the smooth bar, with 9¾-in. radius, and the Kommers square-notch fatigue bars were used.

The tensile bars were broken on standard hydraulic machines, while the fatigue bars were tested in R. R. Moore rotating beam machines running at 10,000 rpm. Data on the tensile tests are given in Table II, while the data from the fatigue

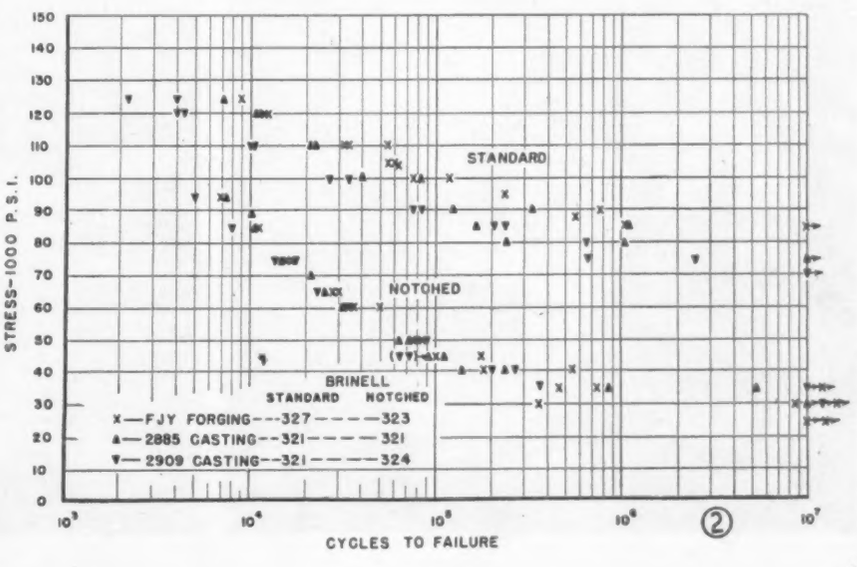


Fig. 2—S-N curves, standard and notched bars from forgings and castings, longitudinal

TABLE I
CHEMICAL COMPOSITION OF CYLINDER BARREL HEATS

Heat No.	C. %	Mn. %	P. %	S. %	Cr. %	Mo. %	Si. %	Remarks
FJY-SC503	0.41	0.74	0.015	0.037	0.99	0.20	0.20	Forging
2909	0.42	0.74	0.030	0.030	0.93	0.18	0.41	Casting
2885	0.45	0.86	0.027	0.042	1.06	0.20	0.47	Casting

TABLE II
PHYSICAL PROPERTIES OF TESTS IN CYLINDER BARRELS*

Specimen	Orientation	Elong. in 2 in., %	Red. of Area, %	Yield Point at 0.2% Offset	Ultimate Strength	Brinell Hardness
FJY	Long.	13.4	59.2	88,150	136,650	323
FJY	Trans.	11.7	38.2	106,800	141,770	323
2909	Long.	13.2	47.6	95,250	138,350	324
2909	Trans.	11.7	47.2	94,300	137,700	324
2885	Long.	13.3	46.6	126,100	156,300	321
2885	Trans.	13.3	48.8	116,500	153,400	321

*Results shown are from single test bars.

TABLE III
CHEMICAL COMPOSITION OF EXPERIMENTAL HEATS

Heat No.	% C	% Mn	% Si	% Cr	% Mo
9349	0.36	0.44	0.38	0.97	0.28
9413	0.42	0.91	0.34	1.00	0.33
9467	0.24	0.69	0.22	0.98	0.21
9650	0.37	0.69	0.36	1.02	0.25

TABLE IV
AVERAGE MECHANICAL PROPERTIES

Condition	Bhn.	Tensile, p.s.i.	Elong. in 2 in., %	Red. of Area, %	Charpy, Ft.-Lbs.
Cast unsound	320	122,800	1.5	5.7	12.5
Cast sound	313	145,100	12.5	36.6	16.5
Cast unsound forged	316	149,200	10.5	28.2	18.3
Cast sound forged	320	152,900	15.5	48.7	22.5

TABLE V
HEATS CAST INTO FORGING BLANKS

Heat No.	C	Mn	Si	Cr	Mo
0	0.33	0.45	0.22	0.98	0.27
1	0.33	0.93	0.34	1.02	0.31
2	0.33	0.88	0.33	1.04	0.25
4	0.35	1.32	0.23	1.03	0.25

tests are plotted here in Figs. 2 and 5.

Discussion of Data: In the tension data of Table II, the higher composition of Heat 2885 will account for its slightly higher strength. In comparing the forgings with castings of Heat 2909, which are very similar in composition, it is interesting to note that although the forgings show somewhat better longitudinal properties, they are inferior in the transverse test. The average of both directions for the forging is the same as for the casting. The principal difference, therefore, is that the forging has directional properties which are absent in the castings.

Fatigue tests were run to exhaustion of available stock, but it is apparent that more data in the lower stresses would have been helpful. In interpreting these data, no general conclusions can be drawn. Only indications can be observed in data of forgings from one heat and castings from two heats.

Considering the width of the scatter band as an indication of integrity and reliability in the steel, it will be observed that, for all steels, they are very narrow, and that there is little to choose between the steels in this respect. In the notched bar tests, the scatter bands are even narrower, which may be taken to indicate that the notch itself is more important than minor differences in the steels.

Although endurance limits were not definitely established, they are indicated roughly by the S-N curves. Again, as in the tensile tests, the forgings seem to have a slight advantage in the longitudinal tests which is lost in the transverse tests. All in all, however, the results are so closely similar that, so far as these tests are concerned, no superiority can be shown for either the forged or the cast steel.

Cast Forging Blanks: One method that has been proposed to relieve the strain on forging facilities is to cast forging blanks that will approximate, in shape and size, the rough forging before it

Fig. 3—The method of casting the forging blank

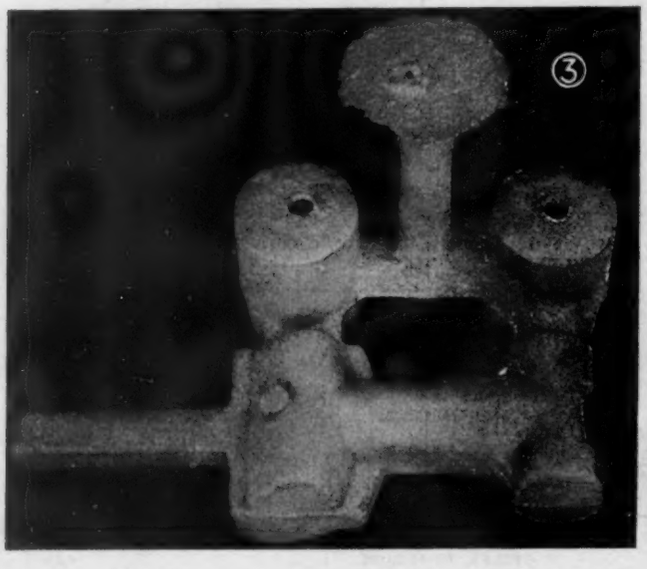
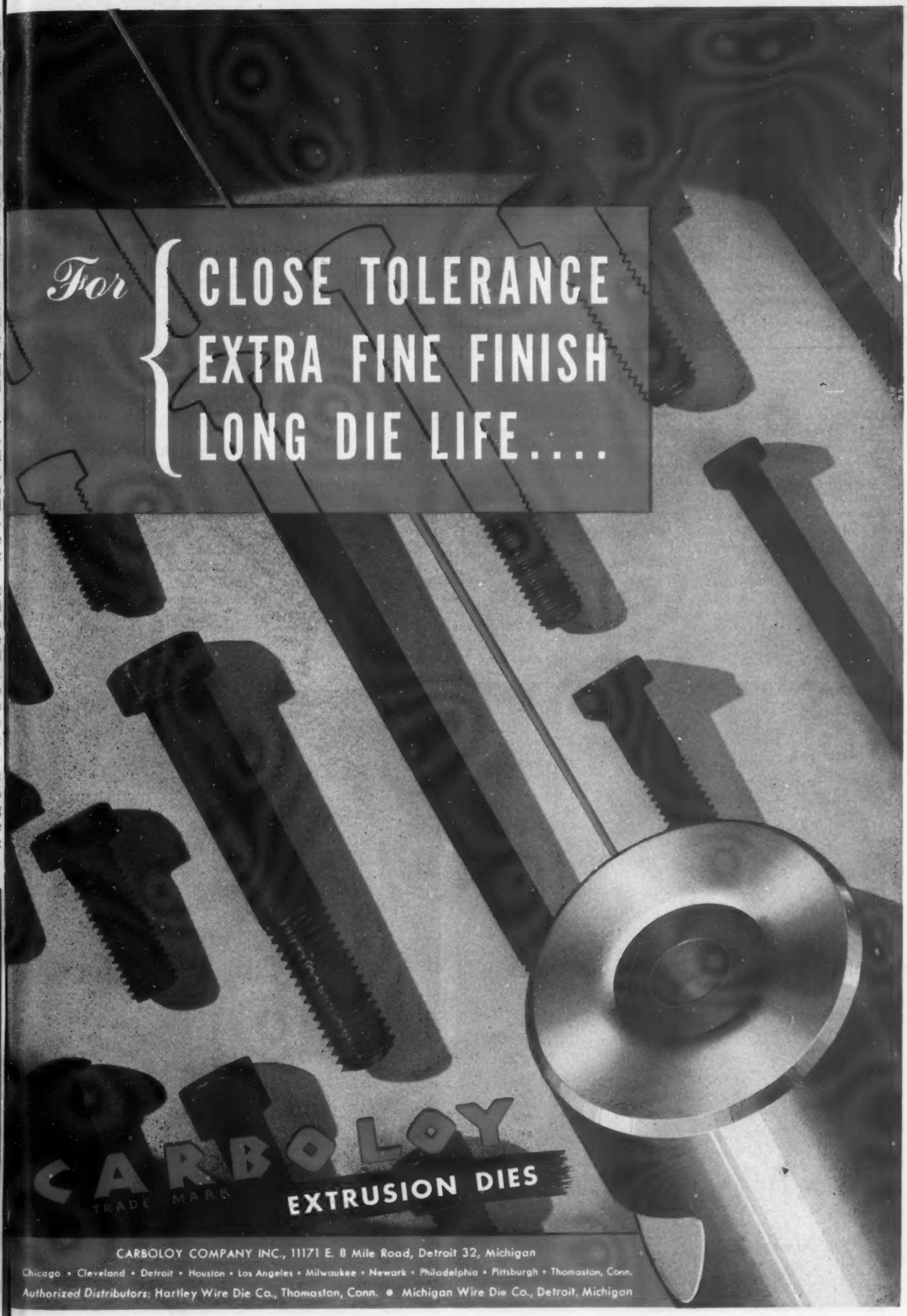


Fig. 4—Improved method of casting forging blank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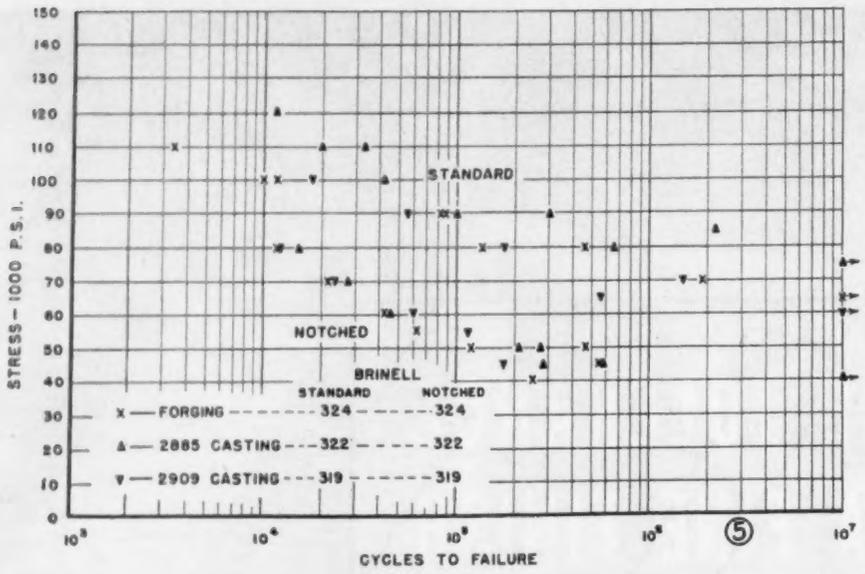


Fig. 5—Forgings vs. castings, transverse stress

enters the last impression of the die block. Two advantages would be gained, it is argued. Smaller die blocks with fewer impressions would be needed on one hand, and the hot working would improve the mechanical properties of the part so that it would more closely resemble forged steel than cast steel, particularly if the castings were not sound in the first place.

Captured German materiel, both ordnance and aircraft, contains many forgings from alloy steels, customarily high in chromium and often high in manganese, that show a cast dendritic structure very little broken up by forging. The inclusions likewise show that only a small degree of hot working has been applied. Casting a blank nearly to size and forging in only one die thus appears to be the present standard German practice, even for very important and highly stressed parts. In some cases, parts normally so made have been found in which the cast blank was machined to size and not forged at all. With the expectation, later verified, that such a process would show increased output per hammer, it was decided to make a short study on the technical aspects, particularly in regard to the properties of the products.

The first experimental work consisted of casting some 1¼-in. square steel bars in SAE 4100 steel with carbon ranging from 0.24 to 0.42 per cent. Half of the bars were cast sound, while the rest were purposely cast with bad center-line shrinkage. Part of these were forged lightly, and then all were heat treated and machined to tensile and Charpy test bars. The composition of the steels used and the average properties for all the conditions are shown in Tables III and IV.

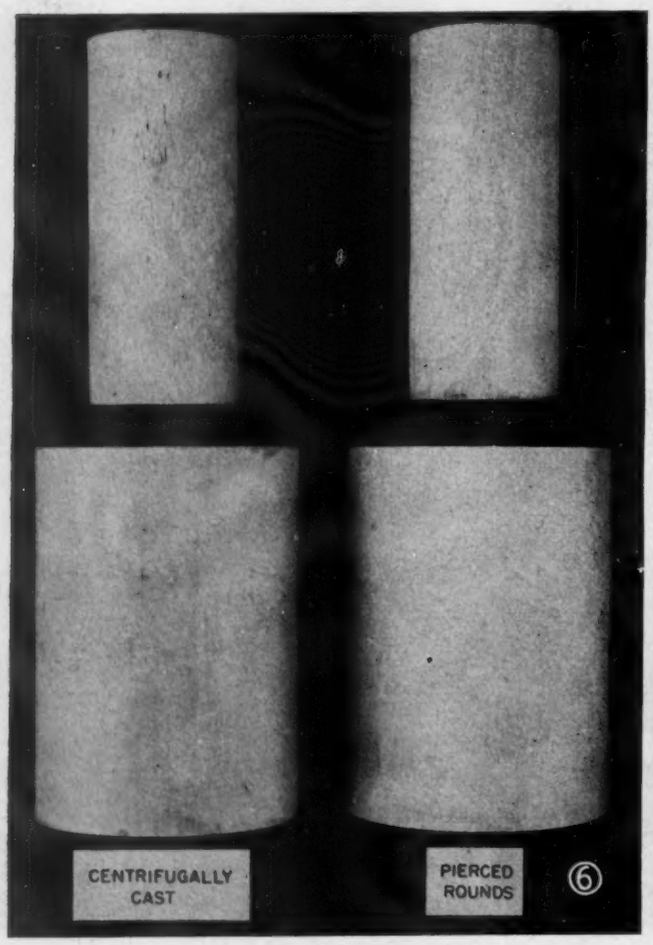
Macroetched sections showed that the forging tended to close shrinkage cavities. These tests, as conducted, show a considerable improvement produced by light forging in the unsound bars and a lesser improvement in the properties of the sound cast bars.

In order to obtain comprehensive test, an aircraft part from a wrought steel blank was borrowed from a local forge shop and used as a model for a pattern. The pattern was made very similar to

(*Please turn to Page* 152)

Fig. 6—Outside surfaces of tubing as macroetched

Fig. 7—Inside surfaces of tubing as macroetched



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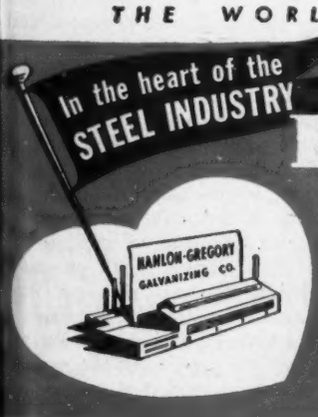

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Iron Mortar Absorbs Vibration

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Improved grout with high early compressive strength and capable of being flowed between foundation and bedplate withstands hammering action under severe operation. Dispersion agent lowers water required for cement, thus increasing strength and reducing amount of correction necessary in initial volume change

By JOHN D. KNOX
Steel Plant Editor, STEEL

Fig. 1 — Large compressor resting on shims and properly aligned

Fig. 2—Top of foundation and bolt holes are suction cleaned

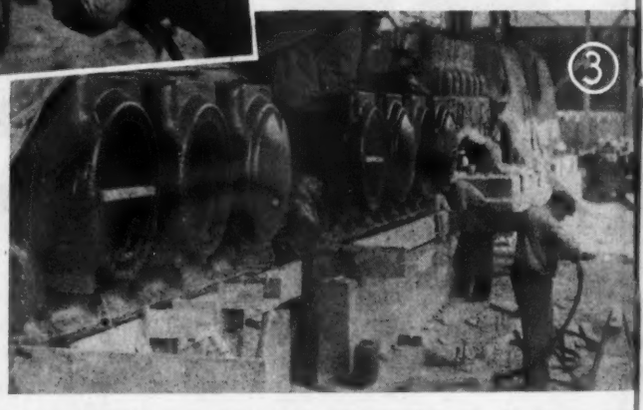

Fig. 3—Forms are built for placement of improved grout

SINCE the time of the early Romans, with the first recordings of Marcus Cato—234 B.C.-149 A.D.—iron chips from the forge have been used in mortars to eliminate shrinkage, although at that particular time the only realization they had of the subject was that in mortars, which included the use of iron chips and filings, the iron expanded and compensated for the natural shrinkage of the mortars and thus made watertight joints in their walls. However, like all things born of antiquity, they were lost from one generation to another, and are reborn in another period.

Little is heard about the use of iron in mortars until 1788, when Thomas Belidor of Paris confirmed the outstanding findings of the waterproofing values brought about in mortars through the use of properly graded iron.* Interest in this subject again subsided until 1925, when the steel industry came into the field with demands for a grout which would stand up much longer than the present-day plain mortar grout, or high early strength grouts, which they were getting with high early strength mortars. Steps were taken to devise a grout which would have much greater durability. Field work disclosed the chief reason for the failure of grouting was the shrinkage between the foundation and the bed plate and inability of a plain cement grout to take sharp impact. Shims and leveling screws were carrying the weight of the machines and, due to the natural shrinkage of the mortar, the engine base plates were not resting upon the grouts in the least, but were constantly embedding themselves through vibration on shims, so that a great deal of misalignment was caused and costly repairs and shutdowns were necessary through the lack of nonshrinking qualities of the grout.

In 1925 the Master Builders Co., Cleveland, designed a specially-treated iron to be incorporated in grouts to overcome the natural shrinkage of the mortar. These irons had been used by the company in previous years to eliminate shrinkage in the repairing of concrete on buildings and large hydraulic structures. Application of this principle to the use in grouting mortars for heavy rolling mill equipment was immediately received with enthusiasm. It was found that these grouts not only eliminated the shrinkage between the foundation and the bed plate, but also afforded greatly increased strengths and durability against the impact of pounding and vibration.

Development of this grouting material progressed over a period of years until in 1932 a discovery of a cement dispersing agent made it possible to obtain a flowable grout with 12 to 15 per cent less water. This had great advantages particularly in increased strength and further controlling shrinkage over previous methods. Cement grouts were not only greatly improved with regard to their compressive strength, because of cement dispersion, but also a large reduction in the total volume change was achieved through the reduction of the water.

This grout, known under the tradename of Embeco, is not only totally shrinkproof but its compressive strength and ductility and oilproofness proved a great advantage over any previously known grouting methods. Adoption and use of this material throughout the steel industry steadily grew until the ramifications of its use extended throughout the United States, England, India, South

*Archetecture Hydraulique, Vol. II, Book I, Chapter 9.

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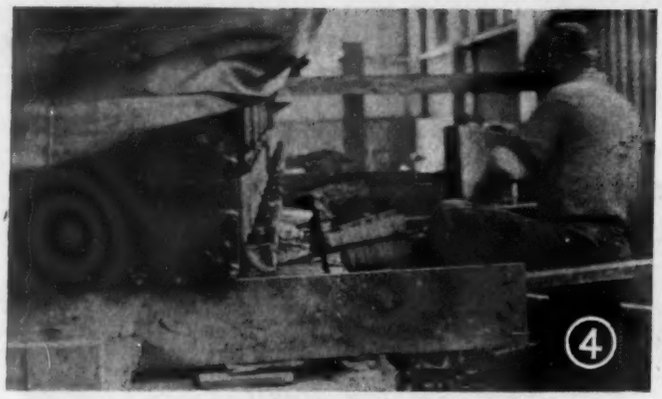
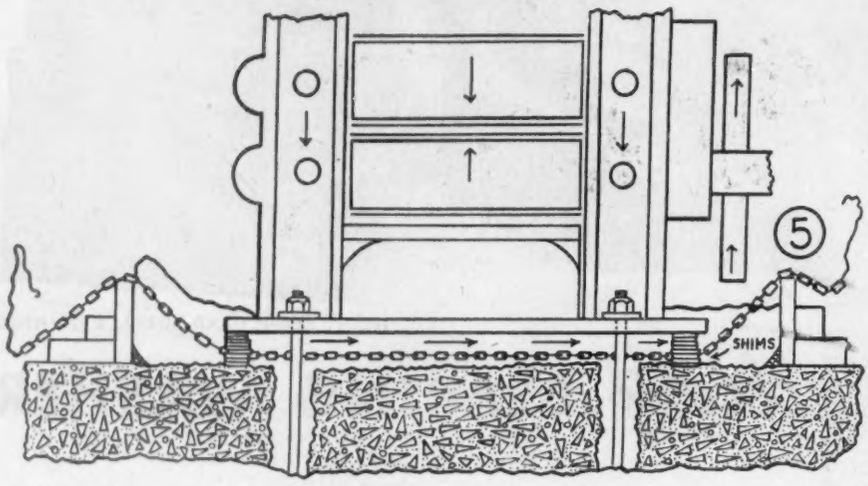


Fig. 4 — Rodding and working of grout to eliminate any air pockets

Fig. 5 — Diagrammatic view of machine grouted and anchored in place



Africa and Canada, and includes all of the leading steel mills of these realms.

Likewise, further developments were made on the subject in order to create a metallic aggregate of high early compressive strength, with the feature of nonshrinking quality. These were embodied in special grouts which allow the early use of equipment in periods as low as three to four hours, which are vitally important money and labor saving elements in steel mill production.

The two primary functions of Embeco are to prevent shrinkage during setting and curing and to produce high compressive strength more or less rapidly. The first of these ends is attained by the oxidation of the specially-treated iron particles, which cause their expansion. The second is accomplished by the reduction of water and the use of ingredients which promote high early strength. Further characteristics of Embeco mixes, which in a measure follow from its two primary functions, are the production of a dense mortar which confers permanent high compressive strength, resistance to corrosive agents and resistance to moisture and oil penetration. A certain ductility or elasticity is imparted by its metallic nature enabling the mortar to take up strains from vibration or impact. All these advantages, however, depend on a proper use of suitable material.

Plain fine iron particles with or without oxidizing agents added to a grouting mortar will not correct shrinkage. In fact, they have the opposite effect by increasing shrinkage. The iron particles must be so combined with the oxidizing agent that expansion starts immediately after mixing of the grout.

Because strength and shrinkage are based fundamentally upon the amount of water used per given quantity of cement—the less water employed for required placeability, the less correction of shrinkage is required and higher are the ultimate strengths. Ordinary plastic and fluid mortars fail chiefly because of the inherent shrinkage tendencies of the solid constituents to settle, leaving a layer of water at the top surface. The dispersing agent in Embeco overcomes this extremely objectionable feature by lowering water requirements approximately 15 per cent, thus increasing the strength and reducing the amount of correction necessary in the initial volume change.

This nonshrinking concrete is being widely used in steel plants for grouting in bedplates for rolling mill housings, turboblowers, levelers, baling presses, forging hammers, compressors, machine tools, etc. The primary requisite for grouting mortar is that it should readily and solidly fill the space to be grouted and permanently retain its original volume, to the end that the unit supported will be firmly held at the correct elevation. Various steps involved in the grouting procedure follow:

1. Forms should be built of strong enough materials securely anchored and shored to completely confine and stand the pressure of the grout under working and rodding conditions. A leaky, unsecure form increases the cost of the grouting job and also wastes much time and material.

2. Junctures of the form should be caulked with a mix of equal parts of cement and sand previous to placing the grout.

3. Waste material or any water should be removed from the anchor bolt holes by an air syphon or other method. Maximum strength is required at these points and the dilution of a properly mixed grout can lead to costly consequences, such as characteristic cracking of the grouts vertically parallel to the anchor bolts.

4. The slab of the foundation should be cleaned off with liberal quantities of water before setting the equipment. Any oil should be removed by the application of a strong caustic solution. The slab also should present a roughened condition for good bond with grout, and should be moist and blotter-like in appearance to assure an easy flow of the grout and prevent its too rapid drying out. However, the grout should not be placed while excess water remains on the roughened surface of the foundation slab.

5. Adequate clearance between forms and bedplate for working grout should be provided.

6. Removal of shims or the loosening of leveling screws is not required when the nonshrinking grout is used as is the case with plain grouts.

7. Working out any air pockets and thus compacting the grout is accomplished by placing ½ to 1-in. link chain under the equipment at intervals before the grout is poured and with wire attached to the ends for passing around the anchor bolts.

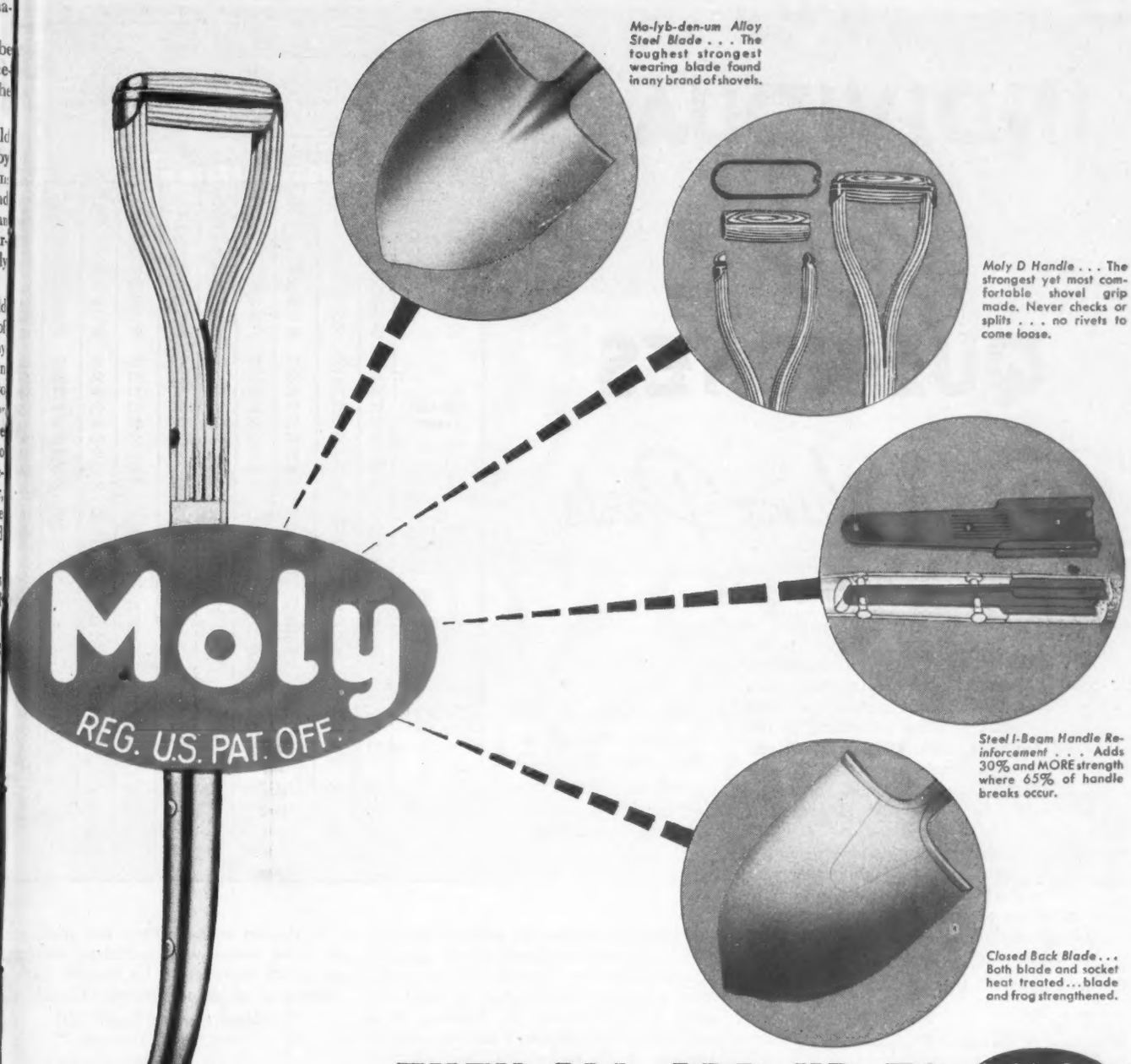
8. Grout should be poured from one end or side only to avoid excessive air entrapment and to assure compactness of grout.

9. Any machines operating nearby should be shut down during the initial setting period of the new grout so that vibration will not be transmitted into the foundation of the equipment being grouted and thus cause fracture.

If the grout is poured in cold weather it is advisable to increase the temperature of the equipment and slab as well as that of the room to 70 degrees Fahr. in order to eliminate the danger of the cold being transmitted from the machine and concrete base into the grout, thus causing the ill effects of a retarded set. This may be accomplished by steaming the base plates or through the use of electric heating coils.

Salamanders should never be used in close proximity to the grout inasmuch as sulphur gases permanently damage and have a retarding effect upon the setting of green grout.

Temperature of the grouting mixture has a direct effect on the setting time. It is difficult to increase the temperature of cold grout after it has been placed by external methods. Once the temperature of the grouting mix is increased to 70 degrees or higher, it is simple to maintain the setting time and hydrating qualities by keeping outside temperature above freezing.



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MO-LYB-DEN-UM ALLOY SHOVELS

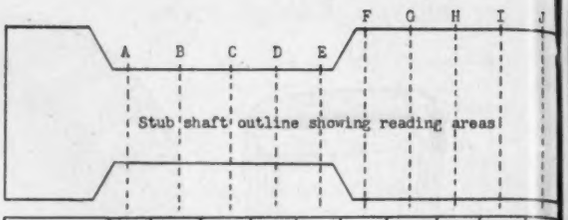
INDIVIDUAL OIL QUENCHES *For Machine Parts*

By A. R. HOTCHKISS

SOMETIMES in quench hardening machine parts by the conventional tank immersion method, the metallurgist finds that he must sacrifice something in desired hardness with a given steel and quenching medium or use a harsher quench and draw the part back to avoid brittleness. In either case the result is not the most desirable.

Some months ago it became necessary to carry on a series of experiments to check a method of overcoming this handicap where a milder quench of oil could be retained and yet the hardness could be raised from 45 to 55-59 rockwell "C." The method that was being used by this plant at the time on stub shafts, with which we were concerned, was to quench in cold water for a period of 10 seconds, from a furnace temperature of 1450 degrees Fahr., followed by finishing in a salt bath at 900 degrees Fahr. An average reading of 45 rockwell C was all that could be obtained in this way. This was lower than the service demanded but being the best obtainable was tolerated.

We began working on the theory that a milder quench flowing around a part in sufficient quantity and speed would drop the temperature rapidly enough to increase the hardness to the desired range in one single operation and thus eliminate the draw.



	A	B	C	D	E	F	G	H	I	J
1st Part Tested	56	57	55	59	55	53	60	56	57	54
	58	58	57	54	58	63	59	54	54	58
	58	60	59	55	55	59	56	55	55	58
	58	57	55	56	55	60	58	55	55	57
	56	56	55	57	55	56	60	58	60	57
	56	61	56	56	57	54	59	59	56	54
	55	57	56	57	53	60	54	61	55	59
	58	55	56	56	58	61	57	57	54	54
	58	55	56	54	57	56	56	54	55	61
2nd Part Tested	60	55	58	56	56	55	56	57	58	60
	60	58	55	56	57	53	56	56	56	55
	56	55	56	58	55	54	57	59	57	58
	59	57	55	54	54	56	57	61	56	55
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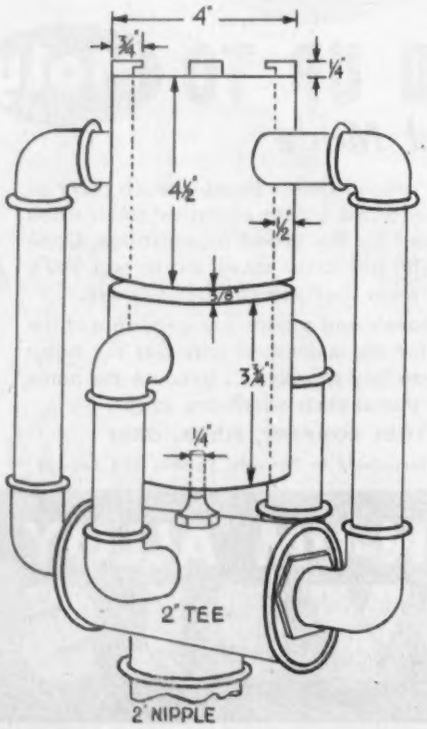
	60	55	58	54	53	55	58	61	54	55
3rd Part Tested	56	57	55	57	54	56	56	58	56	54
	56	56	56	53	55	56	56	56	57	58
	56	58	54	56	56	55	58	53	56	57
	56	57	55	56	54	58	57	58	57	54
	57	57	58	57	56	60	57	56	57	57
4th Part Tested	55	55	52	54	51	57	57	57	56	58
	58	55	56	54	52	56	57	58	56	57
	56	55	55	56	61	56	56	57	57	57
	55	54	55	54	52	58	58	57	56	57
	53	52	55	57	56	55	53	56	57	56
5th Part Tested	55	57	59	56	54	55	58	57	57	56
	54	60	57	57	57	56	56	57	56	56
	54	55	57	57	58	57	56	58	57	57
	55	56	59	55	57	57	57	57	57	58
	56	56	56	56	57	58	59	59	56	58
6th Part Tested	56	56	55	56	54	58	57	58	58	57
	56	57	57	56	56	56	58	56	56	56
	56	56	57	55	57	58	57	58	58	56
	55	57	56	57	53	56	56	58	58	56
	54	55	58	58	55	56	57	58	58	56

Right—Rockwell "C" readings obtained on stub shaft at the 10 points indicated, when using the pressure quench described

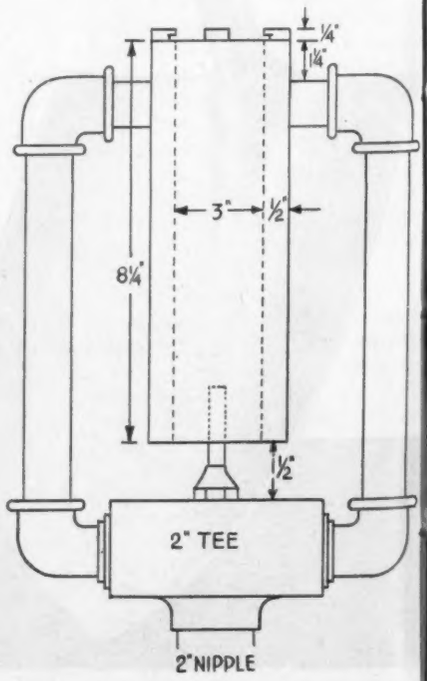
A double walled sleeve was made out of sheet metal with sufficient diameter to admit the part to be treated with a clearance of approximately ½-inch all

(*Please turn to Page* 156)



Left—Oil pressure-quench arrangement, employing the 2-part sleeve. Inner surface of both sleeves is drilled with a No. 42 drill, the rows being spaced ⅜-inch apart and the holes ⅜-inch apart in each row, alternate rows staggered. Fittings from 2-inch Tee to sleeves are ¾-inch

Right—Single sleeve oil pressure-quench setup is similar to the 2-part sleeve



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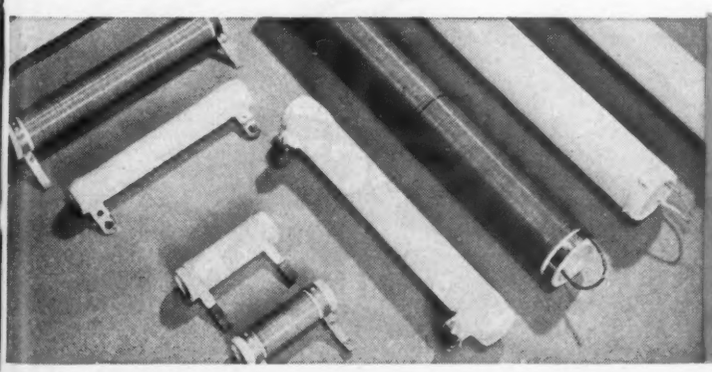

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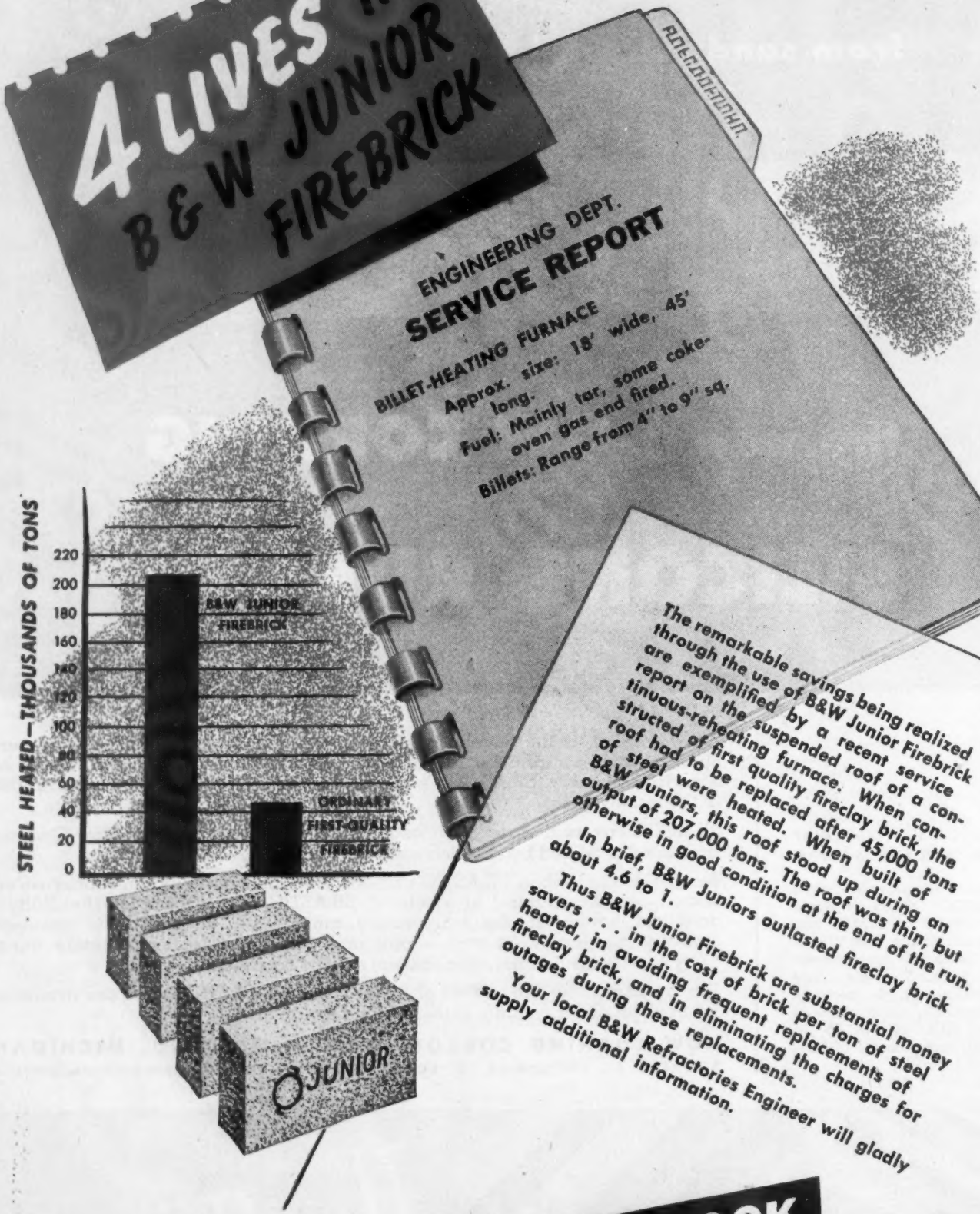

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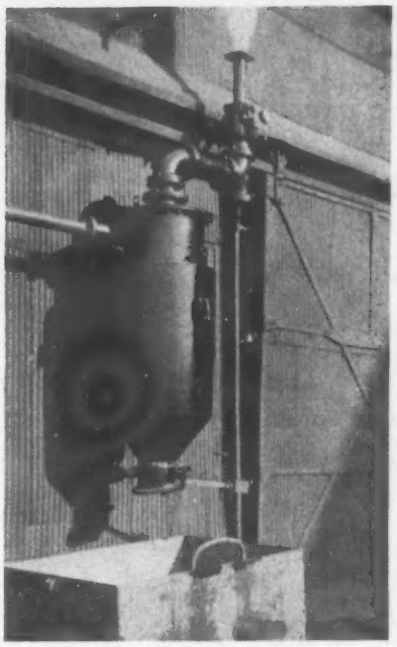
. . . Removes dust from Open-Hearth Flues

Dirt from open-hearth cellars is conveyed by suction through a steel collector main to a receiving tank which empties either into a box or gondola car. Unit can be transferred from one open hearth to another or can be installed permanently. Savings in man-hours range from 50 to 70 per cent, based on early installations. Steam consumption varies from 1800 to 3000 pounds per hour at 125 pounds nozzle pressure



Receiving tank which empties into the box

ANOTHER tough job around the open hearth has been taken over by an appliance which eliminates sweat and toil—that of removing dust from the flues by a vacuum system. The unit is built of rolled steel plates and is of electric welded construction with special abrasive-resisting plates in the cyclone part of the unit which can be replaced when desired.

The system consists of a receiver and steam exhauster which creates a vacuum, standard steel pipe with cast-iron fittings, 60 ft of flexible hose and a receiving nozzle. The receiving nozzle and hose, which are connected to the branch collector lines in the flues, are taken directly into the flues. Dirt is conveyed to the tank for dumping at the rate of 4 to 7 tons per hr, depending upon the size of the unit employed. The material can be moistened before removal though too much wetting causes it to cake in the conveying system.

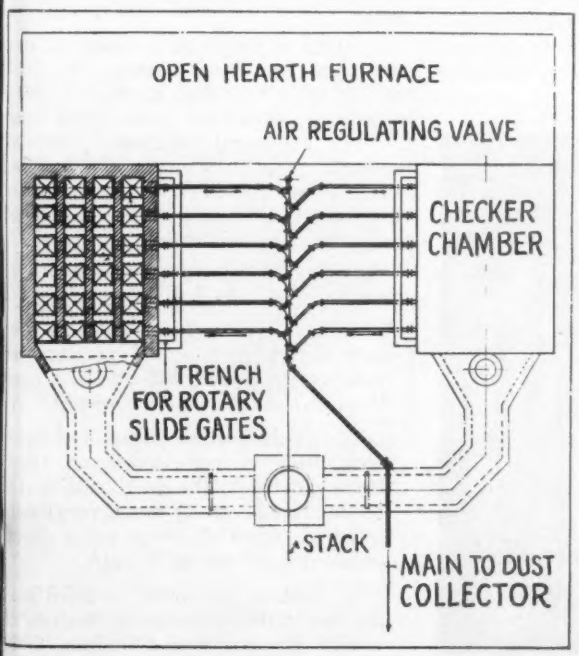
A few months ago at an Eastern steel plant a unit was positioned directly over a standard gondola car into which the material from the furnace was discharged. The cleanout of the open-hearth furnace was effected in about 56 hrs after the fuel oil was shut off with a total of 188 man-hours or a saving of 50 per cent compared with former practice.

Disposal Method Optional

Disposal of the collected material is handled differently by each installation. It can be discharged from the unit into a box or directly into a gondola car which is the best arrangement it is possible to make.

The system can be removed from one furnace to another, or a permanent installation can be made—the unit taking care of six to eight furnaces. The system has been operated at an Eastern open-hearth shop on a vacuum of 6 to 9 in. through a 6-in. collector system. A 4-in. system conveying flue dust 300 ft and with a 60-ft lift requires about 1800 lb of steam per hour at 125 lb line pressure, and with a ¼-in. nozzle in the exhauster.

Different size collectors or conveyor systems have different consumptions of steam. On a 6-in. hookup with a 300-ft horizontal pull and an 80-ft lift, the steam consumption is about 2800 lb per hr at 125 lb line pressure using ⅜-in. nozzles in the exhauster. Vertical lifts of 120 ft maximum, and horizontal pulls up to 500 ft in each direction are within practical working limits of the equipment.



Partial sectional and plan view of open-hearth checker chambers showing location of collector mains

Other Applications Studied

The unit is in use at the plant of the Alan Wood Steel Co., Conshohocken, Pa., and several other steel plants. Consideration is being given to the use of the equipment for removing scale from the pits of blooming and other type mills, for removing cinder at soaking pits, and other applications such as for conveying anthracite coal, coke from soaking pit cellars, dolomite, burned lime, fluorspar, silico sand, etc.

Plans are under way to install a permanent systemto keep the furnace flues free of accumulated material during its entire campaign. This involves the construction of collector pockets beneath the rider walls, checkers and in some parts of the flues leading to the stack—all connected with a piping system to the vacuum system. The installation will be fully automatic and will afford a sharp working furnace. The device is a development of the Vacuum Conveyor Co., 313 North Twentieth street, Philadelphia.

PALLETIZING SHIPMENTS...

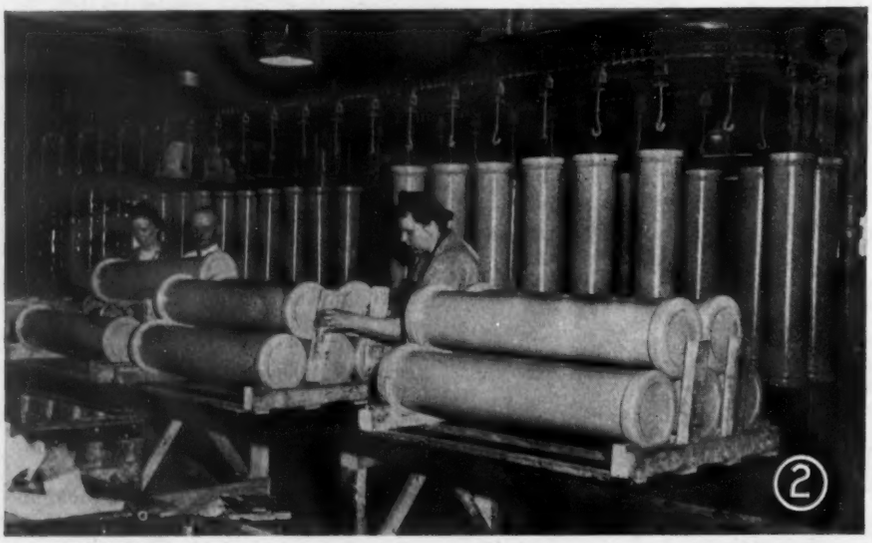
of cartridge tanks cuts $88,000 from cost of one Navy Bureau of Ordnance contract. Time for loading freight cars is reduced from 4 to 1½ hours as labor and materials requirements also drop

PALLETIZED shipments of cartridge tanks for the Navy's Bureau of Ordnance conserve critical container materials, as well as time and labor in loading and unloading freight cars. In comparison to former methods of preparing shipments at Florence Stove Co., Gardner, Mass., this method of handling shipments has shown a reduction of $88,000 from the cost of one ordnance contract, according to *The Palletizer*, publication of the Naval Ordnance Materials Handling Laboratory at U. S. Naval Ammunition Depot, Hingham, Mass.

Formerly, after fabrication, painting and drying, tanks were conveyed to the crating department. There the ends of each tank were covered with a cardboard protector. Then 12 tanks were packed in a wooden crate. Nineteen board feet of lumber and sizable quantities of critical fiberboard were used in this older method of packing. Two men were required to place protectors around the ends of the tanks; 6 carpenters spent an estimated one-third of their time assembling crates; and 3 men were needed to pack the tanks and seal the crates.

Upon completion of the packing, crates of tanks were conveyed to the warehouse. There the crates were handled from conveyors to carloading platforms with two-wheel hand trucks. These trucks had to be towed up a ramp to the loading dock 4½ feet higher than the warehouse floor, by means of hooks attached to a power-driven endless chain. Five men from the shipping room in 4 hours loaded 80 crates containing 960 tanks into freight cars.

Palletization was recommended to company officials by the Bureau of Ordnance after an officer of the Naval Ordnance Materials Handling Laboratory had studied the flow of finished cartridge tanks in relation to existing handling equipment. Under the handling routine devised at the Bureau's laboratory, tanks now are taken from the drying racks, placed on the simple reusable racks shown in Fig. 2 and conveyed directly to the warehouse by the roller conveyor shown in Fig. 1. There they are palletized, as in Fig. 3, in units of 25 tanks each, and two of these are joined to make one 50-tank pallet load. This simplified procedure eliminates the crating department and releases its personnel for other work.



As there is ample floor space in this warehouse, it was not necessary to utilize "air space" by high tiering. Consequently, a motorized hand truck was the only additional handling equipment required. This truck moves the double-tiered pallets from the warehouse up the ramp to the carloading dock. Palletized tanks then are loaded into the cars.

Savings from this operation are as follows:

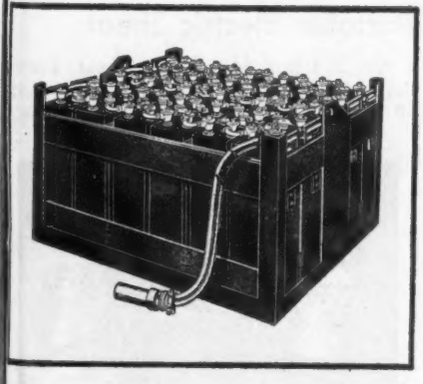
1. Manpower: Four men now perform the entire shipping operation instead of the 10 men full time and one-third of the time of 6 carpenters.

2. Loading Time: One of these 4 men using a motorized hand truck loads and blocks the freight car in 1½ hours, as against 20 hours previously required when 5 men using hand trucks did the job in 3 hours.

3. Critical Materials: A third saving lies in the reduction in the use of critical fiberboard and lumber, 2520

BATTERY TRUCKS GO ALMOST ANYWHERE

Alkaline Batteries Give Them Most Trouble-Free Power



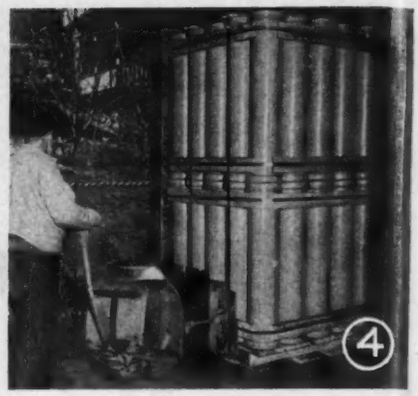
BECAUSE they are quiet and free from fumes, battery industrial trucks can be used without restriction in virtually any department of the plant. They can even be provided with spark-enclosed construction for operation in locations where fire and explosion hazards may exist.

They use low-cost electric power, and they use it with maximum economy, because they start instantly, yet consume no power during stops. With electric-motor drive for both traction and lifting, they have a minimum of wearing parts; are easy to maintain; are rarely out of service for repairs.

Thus, they are inherently dependable and economical, and this is especially important in the war industries where they are working 24 hours a day. Here they have the additional advantage of operating from one battery while another is on charge; except for the few minutes needed to exchange batteries, they need not stop for servicing of the power unit.

They are extra dependable and extra economical when Edison alkaline batteries are used. With steel cell construction, a solution which is a natural preservative of steel, and a fool-proof principle of operation, they are the longest-lived and most durable of all storage batteries. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J.*

Edison
ALKALINE BATTERIES



board feet of scarce lumber being saved daily.

Figs. 3 and 4 illustrate the techniques employed to achieve these savings. In Fig. 3, three men palletize and strap while the fourth man with motorized hand truck moves the unit loads to freight car and blocks the car. Fig. 4 shows the pallet loads as they are placed, 18 to every freight car.

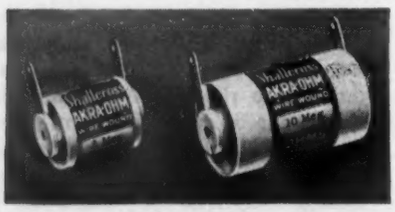
Obviously, any one of the above savings would by itself have made the switch to palletized shipping and carloading worthwhile. The three savings together make possible a daily net saving of more than $320.

The impressive experience of this company is typical of the lower materials handling costs that are being obtained when manufacturing companies standardized on palletized unit load shipments. That many kinds of unit load shipments can be handled with important savings of time and manpower by this method has been amply proved.

INDUSTRIAL EQUIPMENT

Sealed Resistors

No. 1000 series hermetically sealed accurate fixed wire wound resistors, offered by Shallcross Mfg. Co., Collingdale, Pa., are impervious to moisture, fungus, vibration and rough handling. They are constructed without glass, without use of fragile "floating" or stud-locked resistance elements and without

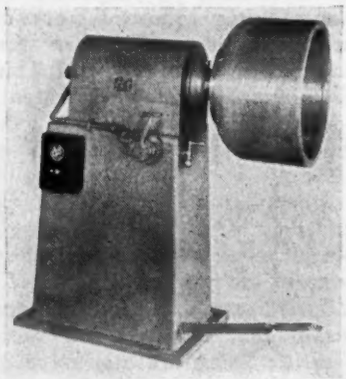


ferrule terminals or caps which give rise to possibility of strain and sealing failure. They utilize standard mounting facilities. They are at present available in two designs and in all resistance values from 1000 ohms to 10 megohms. High ohmic value noninduction resistances can be enclosed in this type of construction without danger of difficulties due to leakage.

Both the resistance form and the protective shell are of ceramic. Resistance winding element and outer shell are a complete, integral unit without internal leads or floating wires. Positive solder-sealing without use of ferrule caps or glass drawing gives protection against moisture and fungus. Windings are of standard noninductive pie type and terminals are of the standard solder lug type. Mounting is accomplished by standard mounting hole.

Variable Speed Lathe

Providing a new method for polishing and finishing cooking utensils, bowls, kettles, reflectors and similarly shaped articles, a new heavy duty variable speed lathe with vacuum holding fixtures makes



possible simultaneous polishing of the object with an evenness of luster.

With this machine the part is revolved, instead of bringing it up against a revolving abrasive or polishing wheel. The part is held in the fixture by vacuum. The machine is capable of handling wide range of vacuum type holding fixture, each designed for the particular object to be held. This type of fixture will not mar or distort the part.

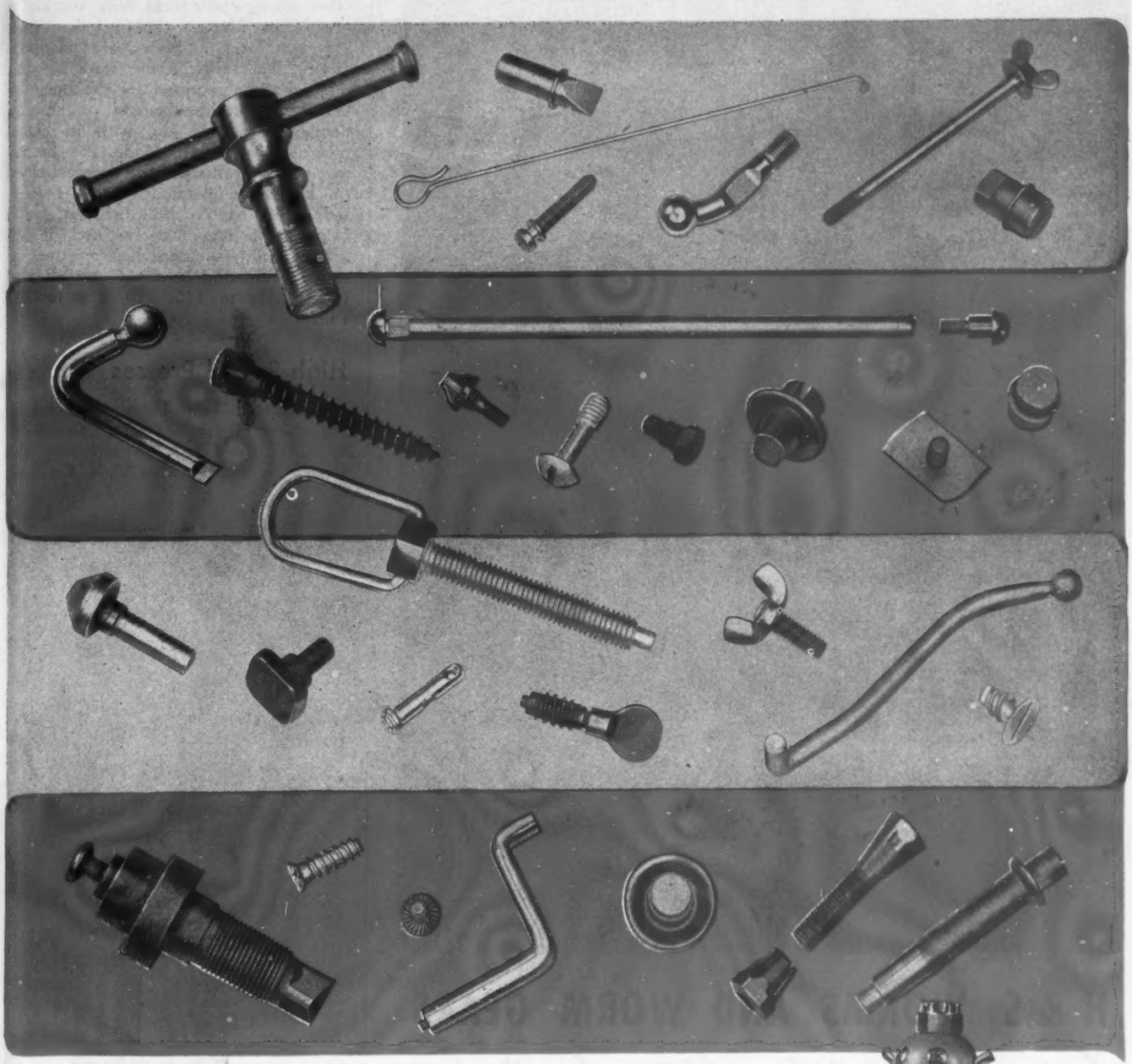
The unit, manufactured by Schaurer Machine Co., 2048 Reading road, Cincinnati 2, features a continuously operating motor; single foot pedal control of clutch and brake; large disk-type brake, for extremely fast stopping of the spindle. Motor is coupled to the work spindle through a Twin-Disc clutch assembly and Reeves variable speed drive. Infinitely variable speeds, from a minimum of 100 rpm to a maximum of 4800 rpm in a ratio of 6 to 1 or 12 to 1, are available.

Portable Electric Shear

No. 214 portable electric shear, introduced by Stanley Electric Tools, Division of Stanley Works, New Britain, Conn.,

cuts 14-gage hot rolled steel and other sheet materials in proportion. First introduced for use in aircraft production, the device has proved its usefulness in

(All claims are those of the manufacturer of the equipment being described.)



Yes· we make "SPECIALS"!

Just take a good look at the picture above—a sample assortment of nonstandard products which we have made by the upset method. Most of these could not have been produced, in the time and quantity required, in any other way.

The upset or cold forging method also saves materials and lowers costs. And in many cases it makes a stronger, better product than that produced by other methods.

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PRODUCTS

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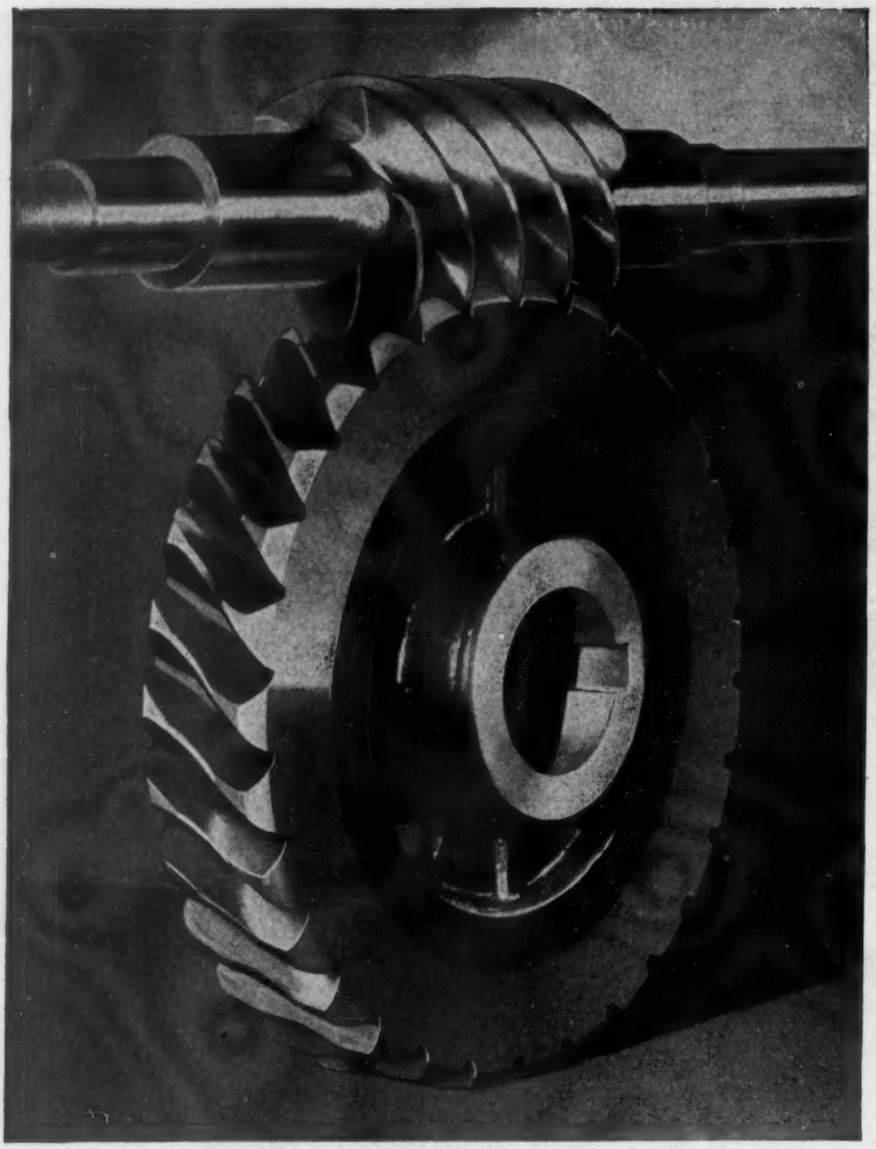

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THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
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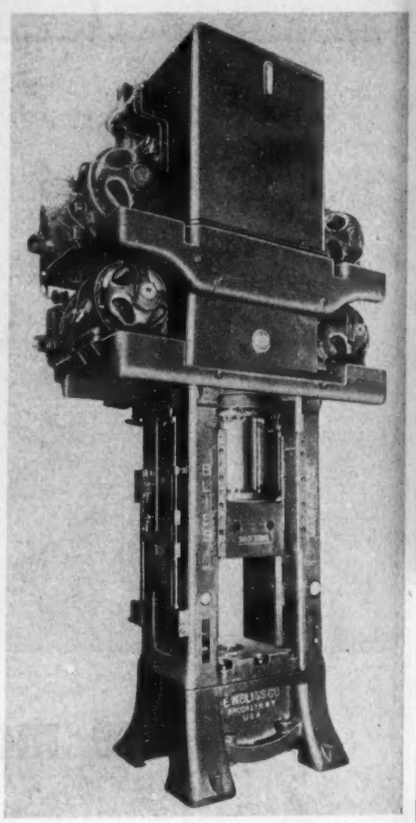
other plants where sheet steel, aluminum or galvanized iron are fabricated.

Designated as Unishear, it has a blade motion that feeds in the work so that little effort is required by the operator to cut straight lines, curves, angles and notches accurately and without distortion of the material. Blades can be removed for resharpening and replaced quickly. Slide-operated switch is located in the handle. Full ball and roller bearing construction is featured. It has a universal type motor that operates on either alternating or direct current, and is available in 115, 220, 230 or 250 volts.

High-Speed Presses

High-speed Hydro-Dynamic presses for the nosing of the 8-in. shell are offered by E. W. Bliss Co., Fifty-third street and Second avenue, Brooklyn 32, N. Y. These



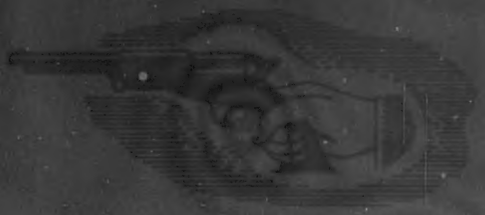
presses are equipped with a 400-hp pumping unit which provides a 5½ sec pressing cycle. This fast pressing cycle prolongs die life and assures uniformity of the product since contact of the dies with the hot work is reduced to a minimum. To aid fast operation the reversal is controlled by four-way valves of special design which permits a fast yet shockless reversal.

On some installations loading and unloading devices operating in automatic or electrically controlled sequence with the press cycle are provided to reduce the labor of handling the shells to a minimum.

General dimensional specifications of the unit are as follows: Capacity, 500 tons; bed area, 40 x 37 in.; stroke of

On 1835 WHEN THIS REVOLVER WAS INVENTED

40 YEAR OLD FREEDOM FORGE WAS PRODUCING 800 TONS OF BLOOMS A YEAR



STANDARD · STEEL · SESQVI · CENTENNIAL 1795 1945

With the name still a household word, it is hard to believe that the Colt revolver is 110 years old. It has been an important weapon in every war, played a big part in opening up the West in the days when every man had to be prepared to battle Indians or desperadoes at a moment's notice, and was the first step in the trend to modern automatic weapons that give today's squad the fire power of yesterday's regiment.

When the Colt revolver was invented, Freedom Forge—now Baldwin's Standard Steel Works Division—had already been turning our ferrous products for 40 years. The plant was rebuilt in 1835, with one chafery and six refinery fires, giving a capacity of 800 tons of blooms annually. Throughout the intervening time it has been an important supplier to American Industry, producing the metals that helped to fight each war, serving the railroads that helped to knit the nation together, supplying industry with castings and forgings to help work producton miracles.

When you need castings and forgings that are out-of-the-ordinary in size, complication or service qualities, you'll find 150 years of experience waiting to serve you. Whatever your needs, the best way to be sure of satisfaction is to "Standardize on Standard." The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U. S. A. Offices: Philadelphia New York, Washington, Boston, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Houston, Pittsburgh.

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CM Bulletin 142 illustrates and describes every operating feature that makes the CM Meteor Heavy Duty Electric Hoist an outstanding production time-saver . . . cutting deep into materials handling costs. Helical gears, aeroplane cooling, low headroom, safety limit brake, simplified maintenance . . . these and other advantages are explained in terms of operating efficiency and service life. Various types trolleys and accessory equipment, lift and speed tables, dimensions, etc., are included.

We invite you to write today. Just ask for Bulletin 142.

Capacities from ½ ton and up. Lifting speeds from 18 to 60 feet per minute . . . Low headroom. Hook suspension, plain, geared or motor driven trolley.

CHISHOLM-MOORE HOIST CORPORATION

(Affiliated with Columbus-McKinnon Chain Corporation)

GENERAL OFFICES AND FACTORIES: 118 Fremont Ave., TONAWANDA, N. Y.

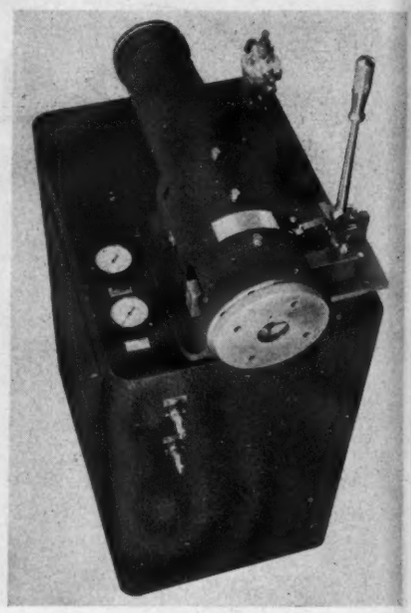
SALES OFFICES: New York, Chicago and Cleveland

press, 24 in. Pressing speed for closing is 600 in. per minute; for pressing, 190 in. per minute; for return, 650 in. per min.

Double Flaring Machine

Model DF Tube Master developed by Leonard Precision Products Co., 1100 Larson avenue, Garden Grove, Calif., produces a double thickness of metal on flange of flares, enabling the tube to hold a greater working pressure and eliminating failure at tube connection.

No hand tools are required in operation of the unit. To change size of dies, operator unscrews face plate and inserts proper size dies. Tool bar slides out of head for change of punches. While intended for nonferrous tubing, sizes 1/8 to 1/2-in., special dies can be provided to handle annealed ferrous tubing sizes



1/8 to 3/8-in. This model is entirely pneumatic in operation and requires an average of 100 lb air line pressure.

To produce double flares, the operating lever which indexes at three positions, is first pressed to open dies for insertion of tubing. Then by moving lever to other two positions, flare is completed. Double flares can be produced at 400 to 600 flares per hour, depending upon aptitude of operator. A minimum of 2 in. of straight tubing is required for gripping tube.

Fastener Assembly

Designated as Spring Lock Fastener, a new 1-piece fastener assembly which does not require nuts or receptacles has been developed by Simmons Fastener Division, Simmons Machine Tool Corp., Albany 1, N. Y. This fastener eliminates the need of lock washers and will not work loose from vibration.

The device is self adjusting to compensate for various material thicknesses within the range of the fastener and locks and unlocks with a quarter turn in a 90

HEAT TREATED ALLOY STEEL CASTINGS

That's our Dish

Illustrated above is a typical group of coupling boxes and spindles—cast in Pitaloy (a special PSF-developed analysis) and heat treated to 400-500 Brinell on all wearing surfaces. If desired, jobs like these are also cast in carbon steel, and PSF heat treating technique and facilities get results with carbon steel that you'd find very interesting. • Where your problems involve heat treated castings, let us work with you.

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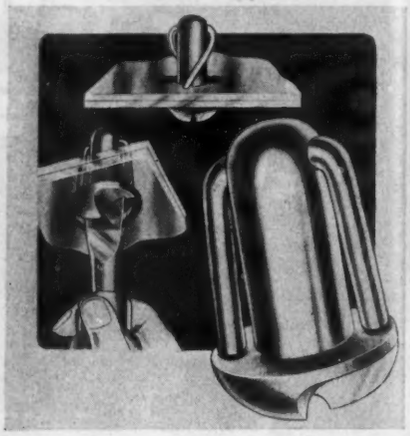
METAL SPOKE WHEELS • GEARS AND FORGINGS • RAILWAY TRUCKS

degree clockwise rotation, or can be permanently installed for use as a blind rivet. Construction of the head assures one direction rotation for locking or unlocking. A quarter turn puts the initial



twist in the spring and another quarter turn locks the fastener in place. Spring pressure pulls the sheets together, providing a tight, vibration proof installation and high initial load without deflection,

Combustion Tube Assembly

An improved combustion tube assembly for carbon and sulphur determination in metals and other combustible materials is announced by Harry W. Dietert Co., 9330 Roselawn avenue, Detroit 4. Two lengths of cylindrical refractory tube liners are inserted within the combustion tube.

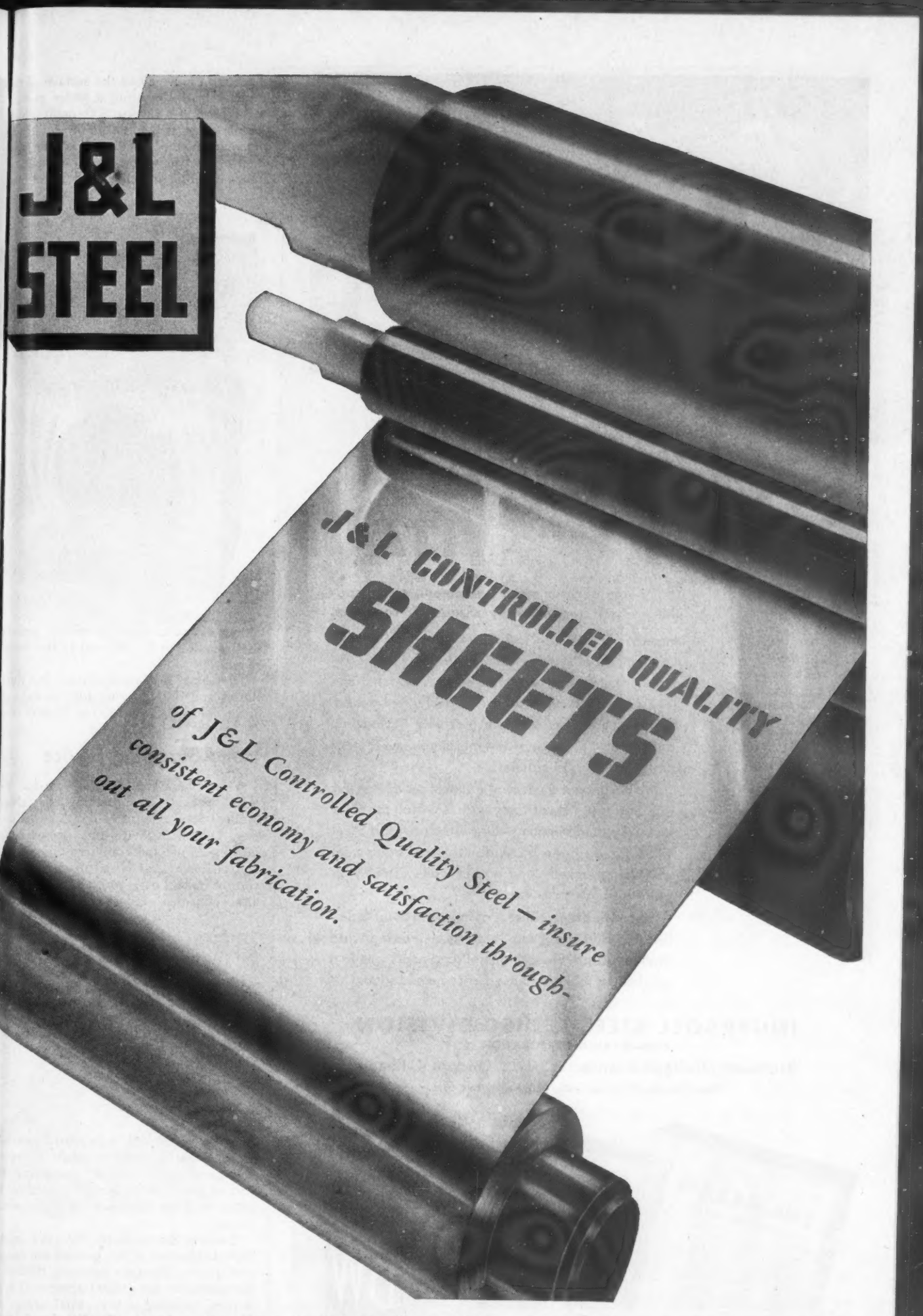
The combustion tube assembly is in-

serted within a high temperature laboratory combustion furnace tube. This center liner will protect the combustion tube from the metal and slag splatter. When the center liner becomes so full of splatter that it interferes with the boat passage, it is removed and a new liner inserted. Life of combustion tube is increased when liners are used.

Air Filtration Unit

Based on the principle of hydrostatic precipitation, Type N Roto-Clone air filtration unit is introduced by American Air Filter Co. Inc., 215 Central avenue, Louisville 8, Ky. Absence of moving parts makes it ideal for safe control of magnesium and explosive dusts, collection of linty and adhesive dusts from buffing operations and exhaust of corrosive gases.

The air is cleaned by a combination of centrifugal force and intimate intermixing of water and dust laden air. The air, forced through the sinuous passage of the stationary impeller, induces a heavy sheet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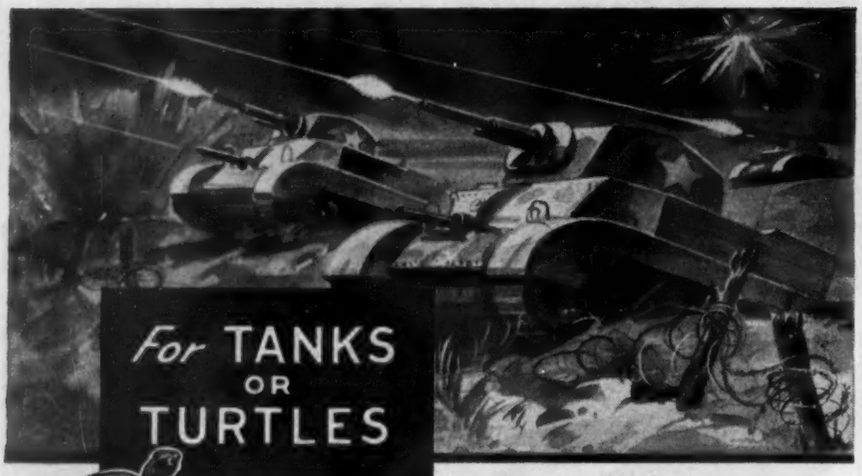
J&L CONTROLLED QUALITY
SHEETS
of J&L Controlled Quality Steel—insure consistent economy and satisfaction throughout all your fabrication.

JONES & LAUGHLIN STEEL CORPORATION • PITTSBURGH 30, PENNSYLVANIA



"Armored Protection" is VITAL!

That's true of your plant equipment, too—especially where steel is unduly exposed to corrosion.

Users of IngAclad include:

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Carnation Milk Co.
Corning Glass Works
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Firestone Tire & Rubber Co.
Graver Tank & Mfg. Co.
Groen Mfg. Co.
Leader Iron Works
Monsanto Chemical Co.
Procter & Gamble Co.
Sherwin-Williams Co.
Solvay Process Co.
United States Potash Co.
Whiting Corp.
and many others.

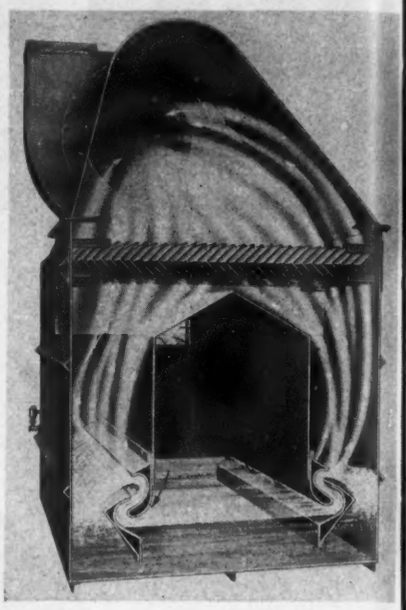
IngAclad Stainless-Clad Steel—product of the Ingersoll Steel Division of Borg-Warner Corporation—is mild steel "armored" with a ply of stainless steel. The two metals are so perfectly bonded into a single sheet or plate that only by looking at the edge or back of the metal can you detect that it is not solid stainless.

In operation it gives real stainless service on the side that is used, yet costs much less than the solid metal. By specifying IngAclad Stainless-Clad Steel when you add new or rehabilitate old equipment you will effectively and economically armor your plant against corrosion.

Since we are producers of Ingersoll Solid Stainless and Heat-Resisting Steels as well as IngAclad Stainless-Clad Steel, Ingersoll Engineers are in a position to make unbiased recommendations.

INGERSOLL STEEL & DISC DIVISION
BORG-WARNER CORPORATION
310 South Michigan Avenue • Chicago 4, Illinois
Plants: Chicago, Ill.; New Castle, Ind.; Kalamazoo, Mich.

of water to move along the surface of the impeller blades creating a water curtain in the form of a reverse S through which the air must penetrate. The collection efficiency is the result of the impingement of dust in water due to centrifugal action in the impeller and scrubbing

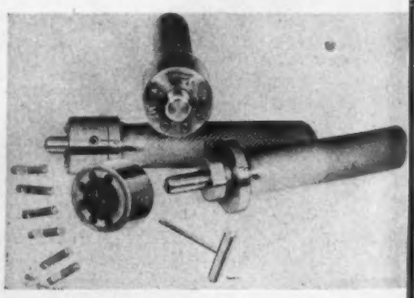


action of water curtain which permits the clean air to be returned to the workroom.

The unit is manufactured in three classes and thirteen sizes for the exhaust of air columns from 1000 to 25,000 cfm.

Hand Stamping Device

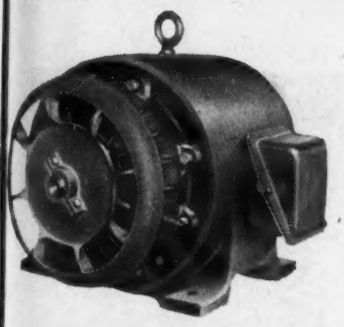
A new hand stamping device for annular marking is introduced by New Method Steel Stamps Inc., 147 Jos. Campau, Detroit 7. With this marker it is possible to use the same size type blanks and characters for all small or large flat surface radii being marked. The device also eliminates need for spacers inserted



between individual type characters. An arrangement whereby a single character can be removed without disturbing the rest of the type makes it adaptable for such work as stamping dates on metal parts.

Locking device above the pilot of the type holder has a flat ground on its circurference. The type retainer, drilled to accommodate the desired number of type, carries indexing marks facilitating the loading and unloading of steel type. When changing a character, the corres-

CENTURY MOTORS —A Vital Factor in Building a Better Product at a Lower Cost.



Century Totally Enclosed Fan Cooled Motor with the steel fan cover removed.

Century Totally Enclosed Fan Cooled Motor End Bracket

Century Totally Enclosed Fan Cooled Motor Frame and field winding showing the air passages.

Century 7½ horsepower totally enclosed fan-cooled motor driving a grinder. This installation subjects the electric motor to attack by abrasive, metallic dust, and coolant mist.

CENTURY TOTALLY ENCLOSED FAN COOLED MOTORS Mean Motor Protection in Destructive Atmospheres

This is true because the vital parts of the motor are isolated from cutting solution fogs, abrasive and metal dust, oil-laden factory dust, chips, etc.

A large fan blows a blast of cooling air around the frame that seals in the windings and bearings.

If you require that motors operate in an atmosphere containing destructive dusts, abrasives, mists, fogs, etc., be sure to call in a Century engineer to get all the facts about what Century Totally Enclosed Fan Cooled Motors can do for you.

Century motors are available from 1/20 to 600 horsepower.

Century C MOTORS

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The Answer TO MANY OF YOUR RECONVERSION PROBLEMS . . .

Focus on FEDERAL SCREW!

In planning a rapid change-over to civilian manufacture, keep in mind the production capacity at Federal Screw Works. The contract manufacture of screw machine products and cold-forged parts has been our specialty since 1919—and the added plant facilities and technical skill resulting from our war work puts us in an unexcelled position to supply many of the parts you may soon be needing.

Federal Screw Works is fully equipped to make screw machine products of all types—to perform all second-operation work, including grinding, heat treating and plating—and to produce parts by cold forging and thread rolling—in any volume desired, and to your closest specifications.

Send us the details of the parts you need. Without obligation on your part, we'll be glad to quote prices and deliveries.

Free illustrated book, "Focus on FEDERAL SCREW", shows at a glance what we can do for you. Write for a copy—on your company letterhead, please.

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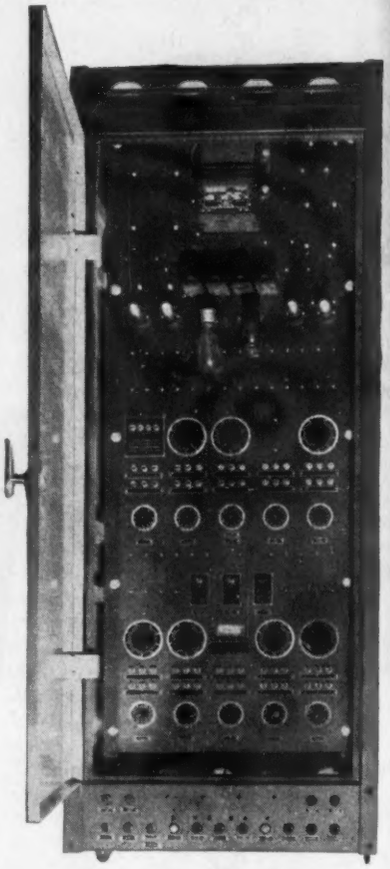
Federal SCREW WORKS

DETROIT AND CHELSEA, MICHIGAN
MAIN OFFICES: 3401 Martin Ave., Detroit 10, Michigan

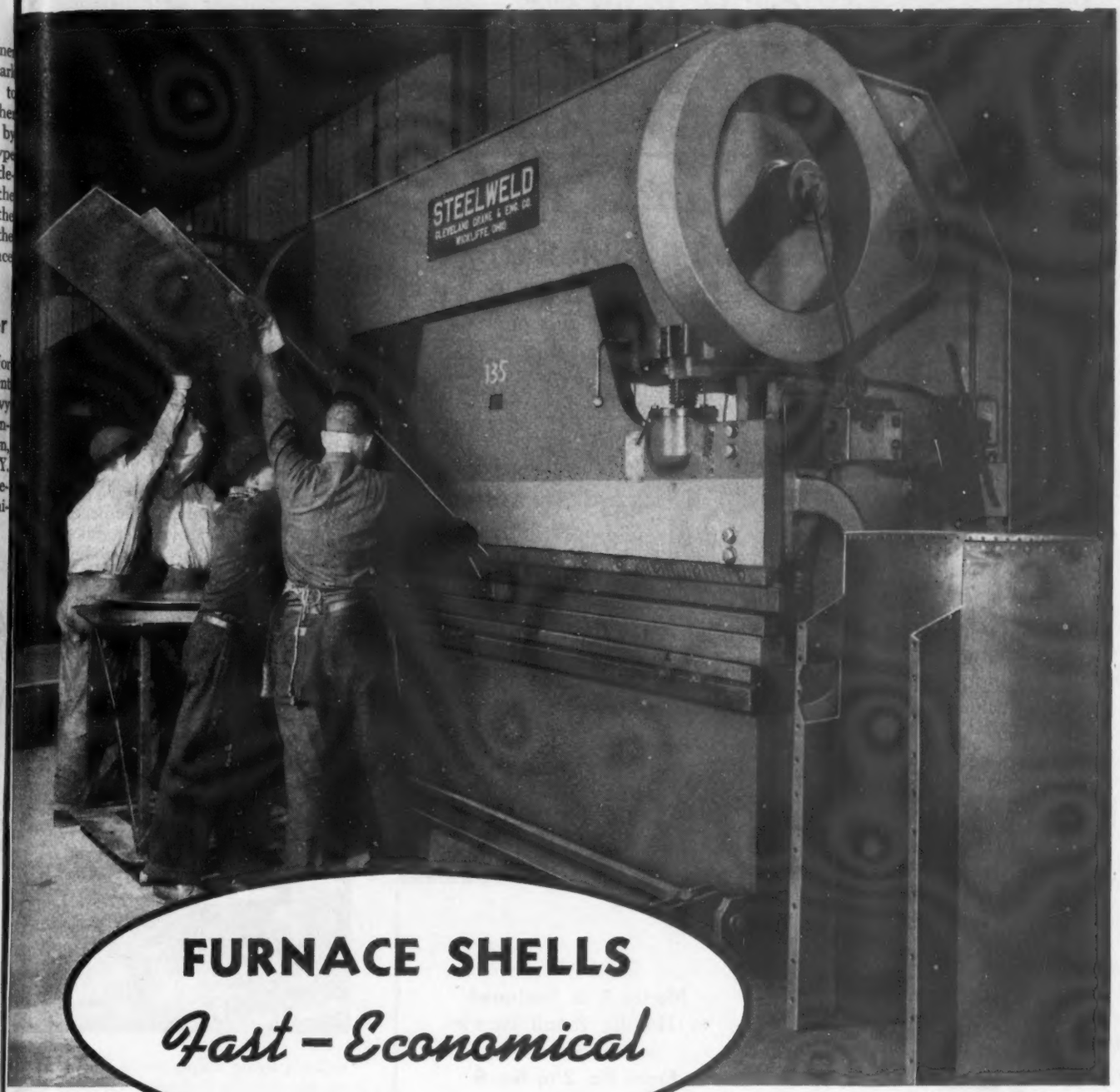
ponding index mark on the type retainer should be registered with the zero mark on the anvil, allowing the character to drop out of the drilled hole and another one inserted. This is accomplished by flats on the round shanks of the type mating with the flat on the locking device. When the indexing mark on the anvil coincides with the mark at the tapped hole in the type retainer, the entire assembly can be locked in place with a single set screw.

Weld and Sequence Timer

A new weld and sequence timer for providing the various time and current adjustments necessary for welding heavy sections of air-hardenable steels is announced by Industrial Control Division, General Electric Co., Schenectady, N. Y. Although this timer is designed especially for use with the company's ignitron contactor and a heat control panel, it can also be used in combination with most of their spot welding controls which include the phase-shift method of heat control.



Operating from 230/460/575 v, 60 cycles, the control adjusts the time of current flow and its magnitude for preheating, welding, grain refinement and tempering. Other adjustments control the time for chilling the weld nugget following the weld and grain refinement periods. For variations in control voltage of plus 10 to minus 20 per cent, consistency of timing will be within plus or minus ½ of 1 per cent of the time setting. However, it is recommended that the company's current regulating compensator be used with this combina-



FURNACE SHELLS
Fast – Economical

Thousands of furnace shells similar to one above have been multi-punched and braked on this Steelweld.

30 rivet holes are gang-punched per stroke in 3/16-inch plate with the Steelweld Press above in the production of shells for "Torrid Zone" warm air steel furnaces at the Lennox Furnace Co., Syracuse, N. Y. Bending and flanging operations are also performed with the machine. Recently this press played an important role in the fabrication of aircraft landing mats.

The press, as illustrated, is set up for two braking operations. The left side of the machine is used for flanging the plate and the right side for braking next to the cylindrical section. Back stops make it easy to produce accurate bends quickly.

The factory manager of Lennox Furnace declares this Steelweld: "A very good machine that is kept busy with all of our braking work."

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CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

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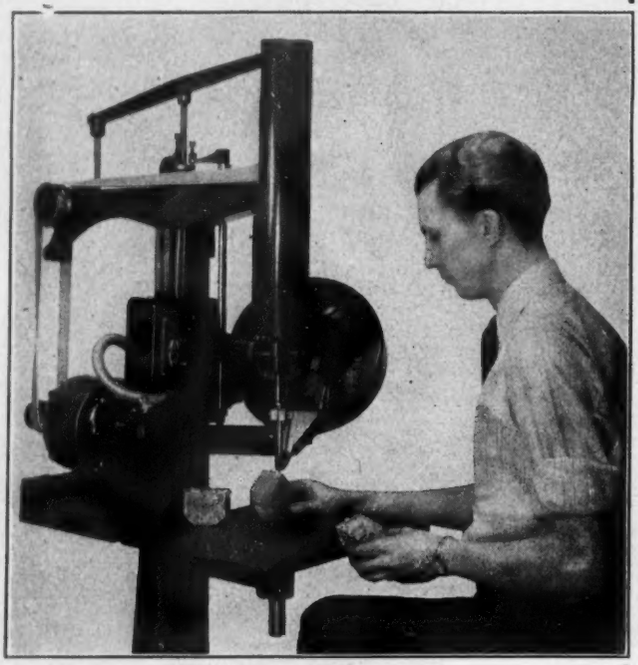
Model B Will Drive Screws From No. 6 to No. 1/4, in Lengths 3/16 to 1 1/2 Inches

●

All Screws Driven to a Uniform Tension

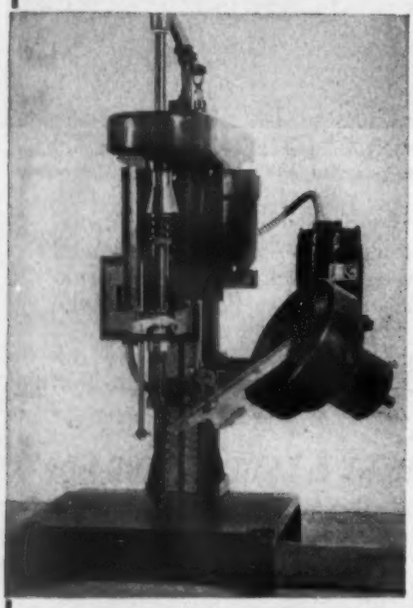
●

No Marring of Heads



MODEL B

MODEL A



Model A Is Designed to Handle Small Screws in Sizes From No. 2 to No. 6 In Lengths From 3/16" to 3/4".

●

Driving Time One Second Per Screw

●

Send Sample Assemblies for Production Estimates and Quotations

ASK FOR CATALOGUE

Detroit Power Screwdriver Co.

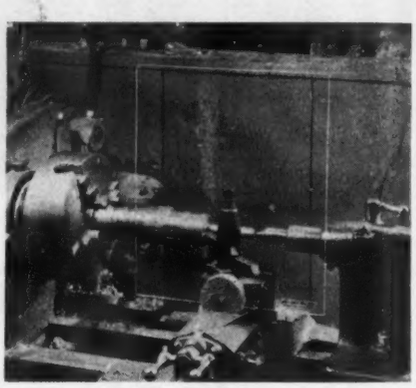
2813 W. Fort St., Detroit 16, Mich.

tion to correct for variations in welding current caused by line voltage variation or the introduction of magnetic materials into the throat of the welding machine.

This control consists of nine time intervals, seven independent heat adjusters, two pressure interval timers, one squeeze timer, one hold timer and provisions for a two-stage foot switch, all housed in a steel enclosure. Control adjustments are accessible on the front of the panel and each timer has a separate time adjustment and an indicating light. The heat control potentiometers have large graduated dials which enable accurate heat settings. A minimum number of tubes are used to give the multiplicity of operations required.

Safety Device

Known as magnetic Grip-Shield, a new safety device to eliminate the necessity of goggles and face shields in many machine tool operations is introduced by Dilley Mfg. Co., 10128 Euclid avenue, Cleveland 6. It consists of thick transparent sheets of plastic anchored into a horseshoe permanent magnet. The magnet in the base of the shield holds it in position, but with a slight twist, it may be moved to suit operating conditions. It



deflects flying chips, metal dust, sparks, oil and liquids to protect machine operators without obstructing vision. Used on all types of machinery such is lathes, grinders, drill presses, milling machines, buffing and sanding machines, or for wood-working machines such as band saw, joiner, planer, jig saw and other types. Sizes range from 4 x 3 in. to 10 x 8 in., and a hood type is also available.

Test Unit

Green Electric Co., 130 Cedar street, New York 6, announces a life-test unit for electronic tubes. The equipment comprises two complimentary units, the plate supply rectifier and the life test cabinet. Up to 1¼ amp at potentials up to 2000 v for plate supply to the tubes under test are provided by the smaller unit, the plate rectifier. Plate supply rectifier is 3 phase operated and built to include a filter, continuously variable voltage control, time delay relay, door interlock safety switches, supervisory lamps, voltmeter, ammeter and interlock cir-

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for uniformly sound alloy steels

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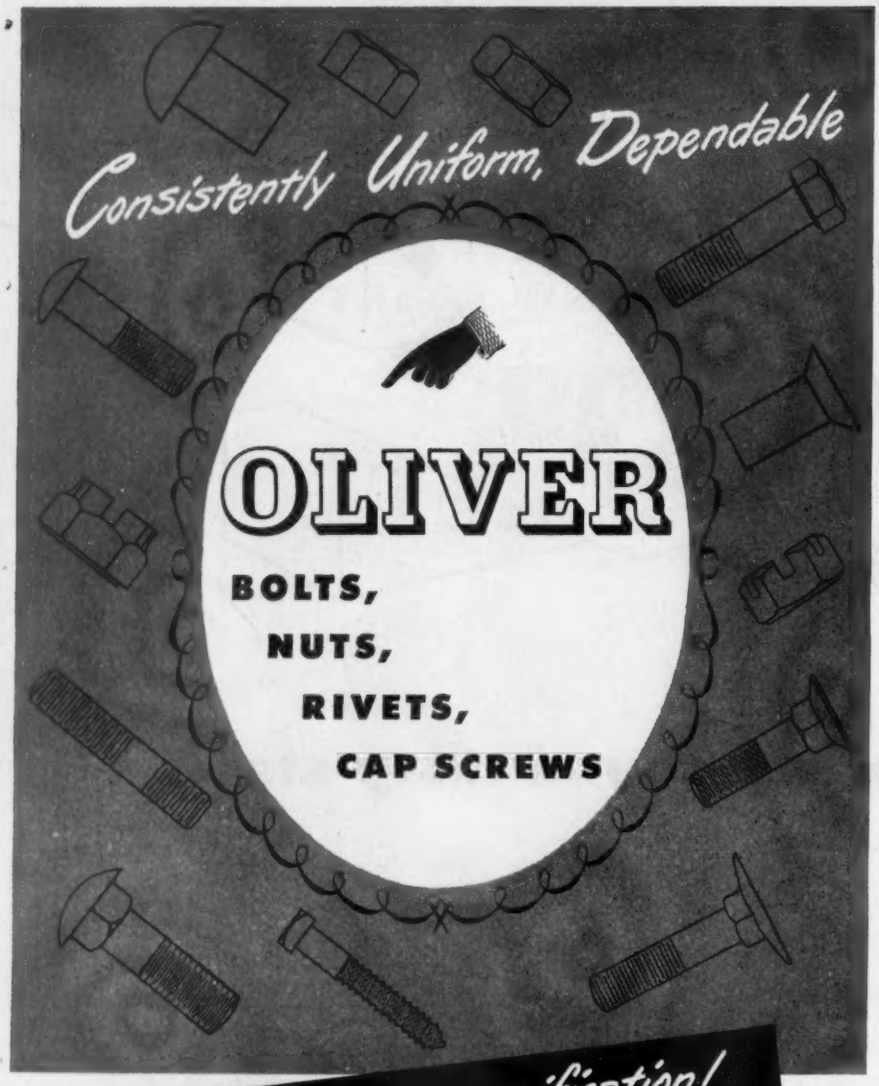

Experience teaches us to depend upon past performance and known qualities in specifying important fabrication items. Therefore, you make no mistake when you select OLIVER Bolts, Nuts, Rivets, Cap Screws and other industrial fasteners.

Being one of the largest and oldest firms in the industry, Oliver has the equipment and the skill to produce uniformly accurate, high quality fasteners with heads and shanks true to size, threads clean and accurate. For severe service or highly precise work, Oliver supplies fasteners that meet your most exacting requirements.

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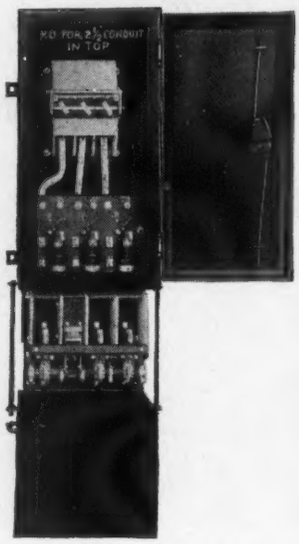
cuits that are connected to the life-test cabinet.

Life-test cabinet accommodates six triodes under test with total plate dissipation of over 2 kw. This unit incorporates continuously variable filament supply, a filament voltmeter, regulated grid supply, plate ammeter, circuit breaker, supervisory lamps, door safety switches and interlock circuits associated with plate supply rectifier.

Electrical Starter

For use in dusty or corrosive atmospheres where short circuit protection without requiring fuses or other protective devices is necessary, Electric Controller & Mfg. Co., 2700 East Seventy-ninth street, Cleveland 4, announces Type LZS-HR combination starter.

This unit has 3 pole heavy duty oil immersed contactor, adjustable magnetic overload relays in each line of a 3 phase



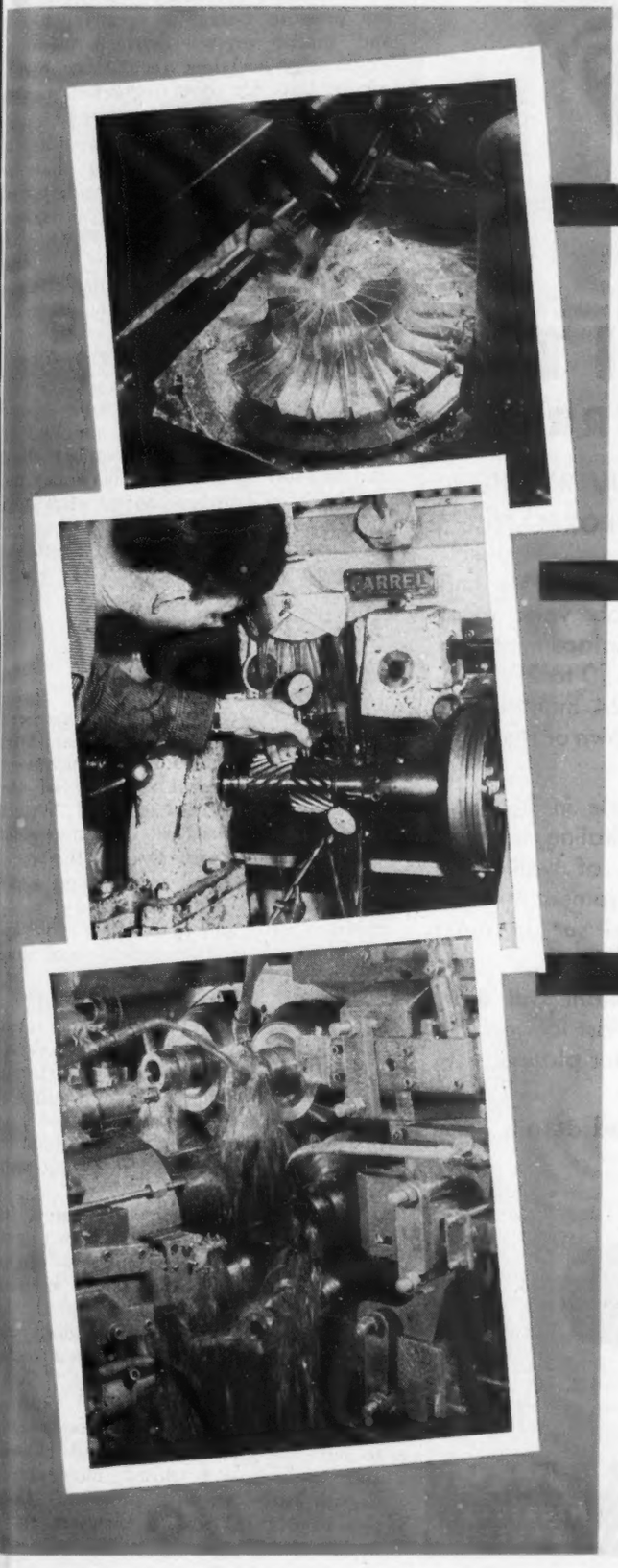
circuit and disconnect switch with externally operated handle. Of high arc-rupturing capacity, this starter eliminates the fuse or other protective devices subject to high maintenance in corrosive atmospheres. It is rated at 50 hp, 220 v and 100 hp at 440 or 550 v. Rupturing capacity is 10,000 amp. Separately mounted push buttons are available to provide either low voltage protection or low voltage release.

Automatic Pump

A 3-in. stroke, 20 hp unit has been added to the line of Aldrich-Groff controllable capacity pumps manufactured by Aldrich Pump Co., Allentown, Pa. Primarily used for boiler feeding, desuperheater feeding, pipe line, process charging and proportioning, these pumps are being installed wherever accurate, automatic control of delivery is important. Operated at constant speed, from no-load to full rated capacity, power consumption of the units is practically proportional to discharge

There's an improvement

in production, tool life, and finish when the proper Gulf Cutting Oil is used!



Aircraft Supercharger Impellers

Gulf Cut-Aid proved superior to twelve other brands of cutting oil tested in this plant for straddle milling aluminum alloy supercharger impellers. With this revolutionary new cutting oil, production is 10% greater and tool life 50% longer than with cutting oil previously used.

Helical Gears

The use of Gulf Cutting Oils on this gear generator led to a 20% increase in cutting speed, 25% greater tool life, and improved production.

Shell Adapter Rings

When the proper Gulf Cutting Oil was put in service on this big automatic, rejects were reduced to a negligible percentage, tool life was greatly increased, and bearing trouble was eliminated.

AGAIN AND AGAIN, on the most exacting war assignments, Gulf Cutting Oils have made outstanding improvements in production and tool life. Call in a Gulf Service Engineer today and let him show you how they can help you with *your* machining problems. Write, wire, or phone your nearest Gulf office.

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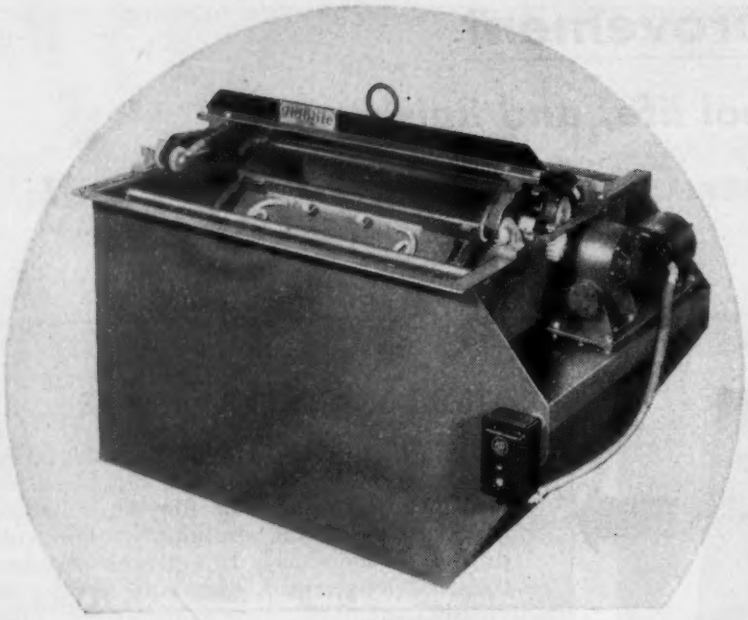
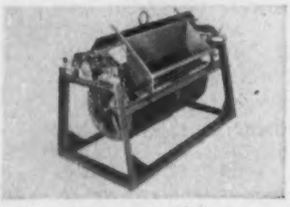
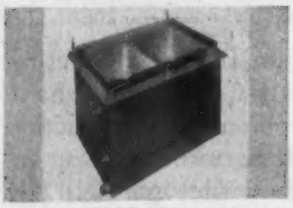


Plating cylinder.

Double chute perforated rinse.



Loading stand with hopper.



Hopper type, rinse unit.

Transfer stand.

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PLATING BARRELS

RECOMMENDED TO YOU BY THEIR FINE RECORD OF PERFORMANCE

● UDYLITE barrels are built to do a uniformly GOOD plating job year after year with a minimum of replacement and repair. Carrying loads of 150 to 200 lbs., service records of 18 to 24 months continuous use without breakdown or replacement are not unusual.

These barrels are available in a range of standard sizes, for alkaline or acid solutions. A complete line of well engineered supplementary equipment (as illustrated) make this barrel set-up most practical and efficient.

Operation in your own plant will show you that UDYLITE barrels last longer and produce consistently superior plating, with far less maintenance.

Complete specifications and details upon request.

Cylinder, cleaning unit.

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REPRESENTATIVES IN ALL PRINCIPAL CITIES

Cutting Outfit

(*Concluded from Page* 107)

control conditions necessitated the development of special pre-set gas regulators to assure proper flow of oxygen and acetylene to the torch. Gas regulators are small and of a compact lightweight design to reduce the overall dimension and weight of the complete outfit. Specifications developed by the Bureau require manufacturers to produce pre-set delivery pressure 2-stage oxygen regulators and similar pre-set delivery pressure single stage acetylene regulators. Strict service tests for these regulators assure safe and economical delivery of gases.

To assist inexperienced operators, a brief but complete instruction chart is permanently attached to the inside cover of the main stowage cabinet, as shown in Fig. 2. This chart has an illustration and sequence description for inexperienced personnel. Supplementing the instruction chart is an illlustrated manual detailing operation of the equipment, safety instructions and spare cylinder replacement.

Complete outfits of pack type equipment and spares are being supplied as rapidly as possible to all combat ships and to many auxiliaries. The apparatus ultimately will become an essential item of every United States ship's allowance list, making obsolete older oxyacetylene equipment.

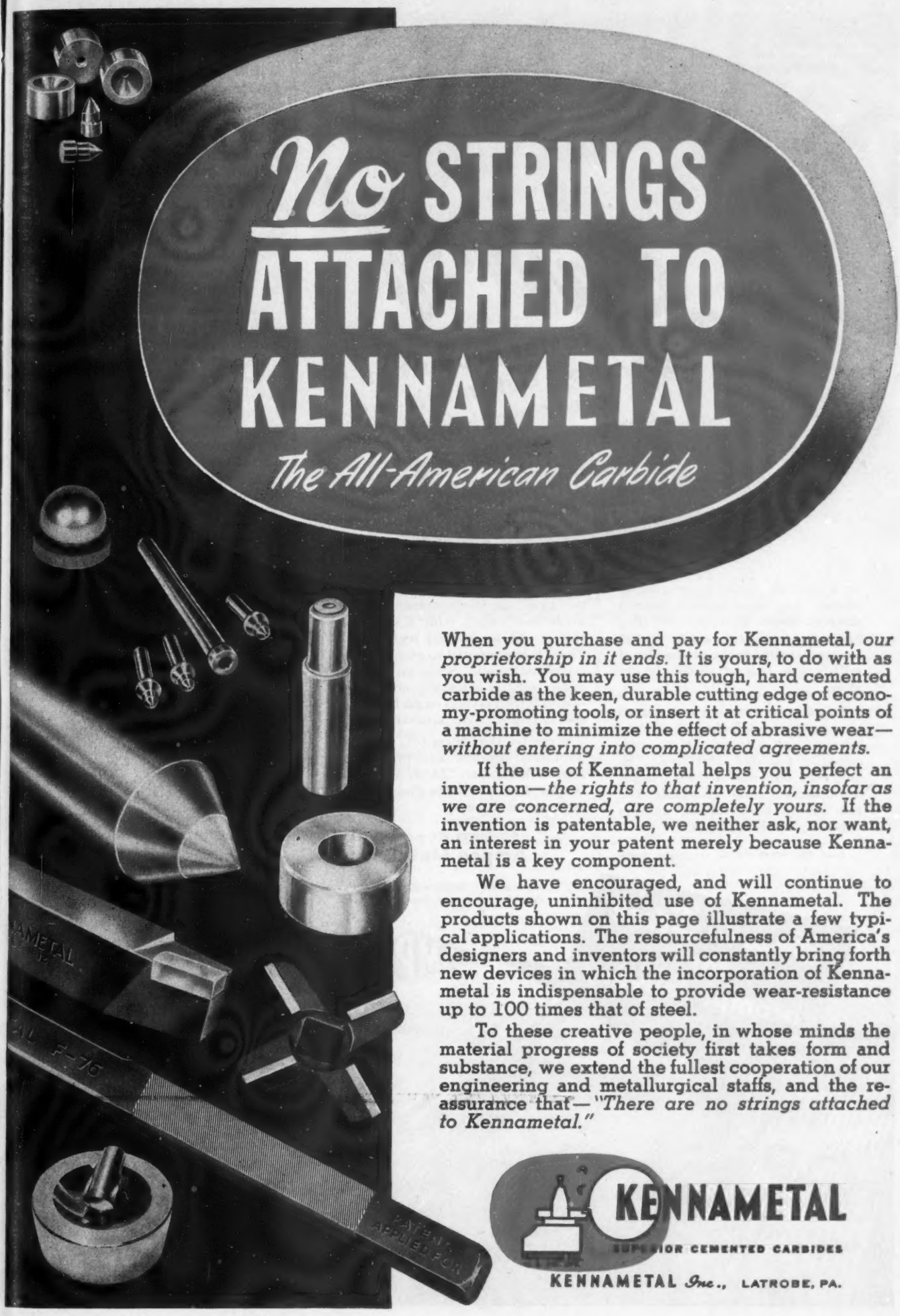
Airtight Vertical Lift Door Developed

An airtight vertical lift door has been developed and built by Kinnear Mfg. Co., Columbus, O., for the Unconventional Power Plant Laboratory of the Air Technical Service Command, Wright Field, Dayton. Its basic operation principle is similar to many of the company's rolling or upward opening types of doors, but it also incorporates many features with practical value for applications where a special type of door is required.

Door is spring counterbalanced (no weights required) and motor operated. Airtightness, when door is closed, is accomplished by means of air inflated rubber tubes. Inflation of sealing tubes is controlled by valves working in conjunction with motor operating mechanism, which in turn is controlled by properly labeled push buttons.

Door can be raised or lowered for regular service purposes without putting air-sealing mechanism into operation. Mechanism is interlocked so that, should door be closed and sealed, the motor operator will not start door upward until air-seals have been automatically deflated.

To lower door from raised position and seal it airtight, it is necessary only to depress a push button marked "closed" and, when door is closed, momentarily depress button marked "pressure." Door also is provided with a blow-out panel in case of explosion.



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When you purchase and pay for Kennametal, *our proprietorship in it ends.* It is yours, to do with as you wish. You may use this tough, hard cemented carbide as the keen, durable cutting edge of economy-promoting tools, or insert it at critical points of a machine to minimize the effect of abrasive wear—*without entering into complicated agreements.*

If the use of Kennametal helps you perfect an invention—*the rights to that invention, insofar as we are concerned, are completely yours.* If the invention is patentable, we neither ask, nor want, an interest in your patent merely because Kennametal is a key component.

We have encouraged, and will continue to encourage, uninhibited use of Kennametal. The products shown on this page illustrate a few typical applications. The resourcefulness of America's designers and inventors will constantly bring forth new devices in which the incorporation of Kennametal is indispensable to provide wear-resistance up to 100 times that of steel.

To these creative people, in whose minds the material progress of society first takes form and substance, we extend the fullest cooperation of our engineering and metallurgical staffs, and the reassurance that—*"There are no strings attached to Kennametal."*

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Sizes up to 2" diameter — in a tin bronze, a high-lead bronze, and SAE 660 bearing bronze
Big Savings
faster production on automatic screw machines
...with Ampcoloy Continuous-Cast Bronzes

As a part of Ampco's program to provide American industry with a *complete service* on copper-base alloy parts, the continuous-casting process has been applied to the production of mill-length rods of certain bronze alloys.

This process, exclusive with Ampco as to bronzes, results in rods of close tolerance and a soundness not commercially available until now. The fine, even dispersal of the secondary constituents is truly remarkable. The rods are of good surface, uniform diameter, and even length.

Fast semi-automatic or fully automatic machines can be used, with big savings in time, manpower, and money. Tools last longer, with a sand-free surface and no internal segregation. There is less material to purchase, receive, and handle. Scrap loss due to metal faults is practically eliminated —with further savings on the handling and storing of scrap accumulations.

Write for Data Sheet 131, showing photomicrographs and properties. *Ampco Metal, Inc., Dept. S-6, Milwaukee 4, Wis. Ampco Field Offices in Principal Cities.*

Ampcoloys are a product of

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. . . specialists in engineering—production — finishing of copper-base alloy parts.

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AMPCO

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Bars in Stock for prompt delivery

Gas Immersion Tubes

(*Continued from Page* 110)

or back pressure to the atmosphere.

With sealed-in pressure type burners, there seems to be no reasonable limit to the amount of gas which can be completely burned. For example, with a tube length of over 40 ft it was possible to burn gas completely at an input rate in excess of 80,000 Btu per hr per square inch of cross-sectional tube area. Apparently, the only limitation to combustion rates with this type of burner would be established when frictional resistance exceeded the power output of the premixing unit.

As in other methods of gas heating, thermal efficiency characteristics of immersion tubes are improved by maintaining excess air at the minimum amount consistent with complete combustion. Extent to which excess air can be decreased without impairing combustion depends on burner design. It is particularly important from a combustion standpoint that secondary air in the case of atmospheric burners be directed into the tube near the base of the flame.

Effect of Excess Air

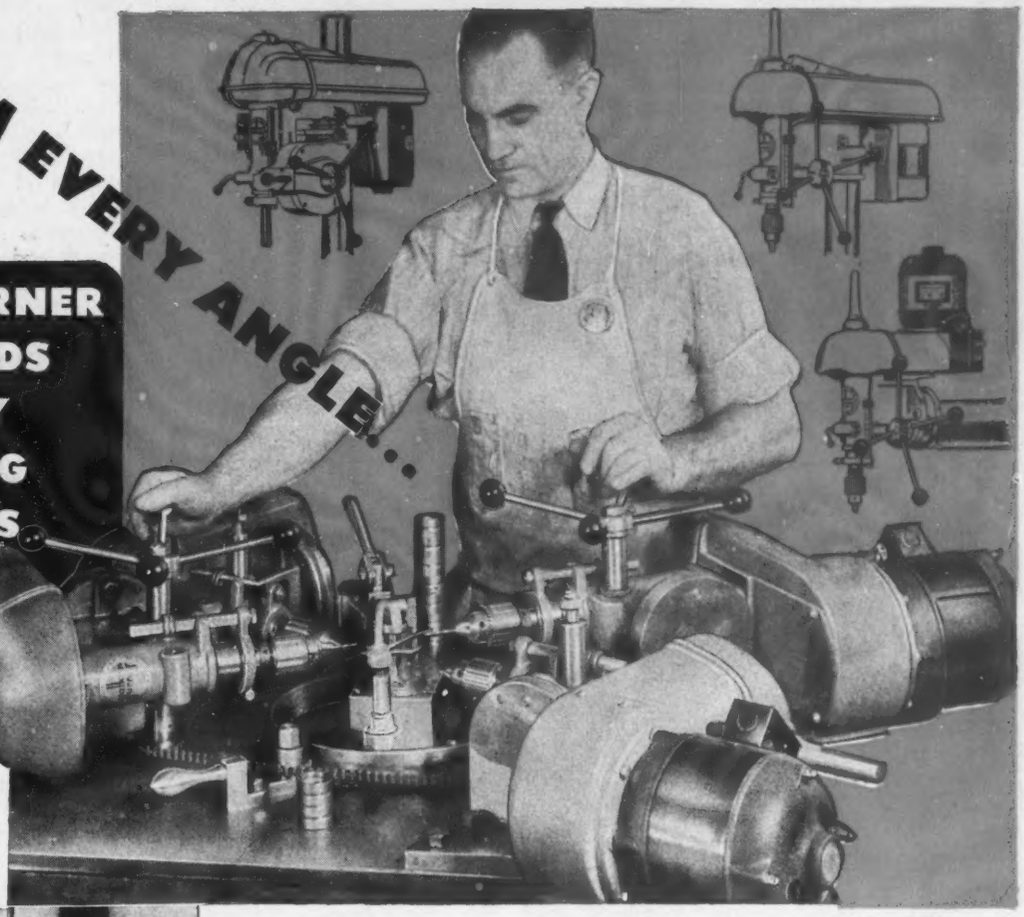
Effect of excess air is illustrated by the relationship between concentration of carbon dioxide in flue gases and thermal efficiency of a 4-in. immersion tube shown in Fig. 4. From this it is apparent that any comparative tests on various sizes of immersion tubes is contingent on maintenance of a fixed concentration of carbon dioxide. For this reason the percentage of carbon dioxide was maintained at 10 per cent during all tests (equivalent to 20 per cent excess air). This particular value was arbitrarily chosen to attain a reasonably high thermal efficiency and to provide sufficient excess air for complete combustion over a wide range of input ratings.

Data obtained on various tube diameters indicated that, for heat transfer purposes, return bends and 90° ells were equivalent to 1.1 ft of straight pipe plus the length of the fitting along its centerline in feet. Since use of such fittings was found to increase frictional resistance to flow of flue gases considerably more than the rate of heat transfer, it would seem preferable, if space limitations permit, to increase the length of immersion tube for additional heat output.

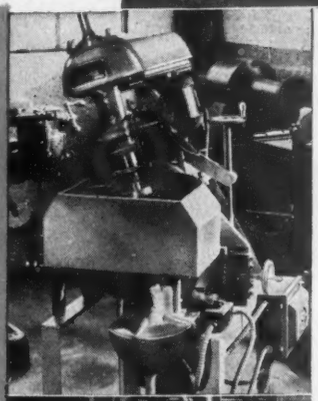
Baffles are seldom, if ever, used in immersion tubes of any appreciable size. Extended heating surfaces on the outside of a tube, obviously, would serve no practical purpose for many applications since the rate of heat transfer from the flue gases to tube wall is extremely small in comparison to the heat transfer from the metal to water or most other liquids in which the tube may be immersed. If extremely viscous fluids, such as oils, are being heated externally, extended fins may be of some value. Simplicity of immersion tubes as

FROM EVERY ANGLE...

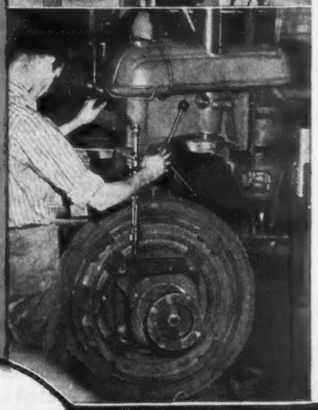
WALKER-TURNER DRILL HEADS SIMPLIFY RETOOLING PROBLEMS



Four Radial Drill Heads mounted horizontally are used by S.K.F. Industries to drill two opposed holes in bearing races. The drill spindles are interconnected and operated simultaneously, completing two bushings in one operation.



Two Radial Drill Heads working in conjunction to rough grind lens blanks to specified curvature.



20" Drill Head converted to a highly efficient Jib Drill does the work of a 12 foot Radial.

Check These High Spots:

- Operate vertically, horizontally, at any angle — even upside down.
- Careful selection of materials, superior design, rugged construction, assure long service at high level of precision.
- Speed ranges from 85 to 8300 R.P.M.
- Safe, simplified operation.
- Low initial cost—low power consumption—low maintenance.
- Handle Metals, Plastics, Wood, Ceramics, Glass.

For a faster reconversion when the time arrives, it will pay you to look into the tooling possibilities of Walker-Turner Drill Heads, *now!*

Compact, flexible Walker-Turner Drill Heads are available in 20" models (hand or power feed) and 15" models (hand feed or radial). Four ball bearings on splined spindles—full floating spindle pulley — one-piece head casting—many other features—maintain high production and precision, while slashing costs!

WRITE TODAY FOR FREE, FACTUAL DRILL HEAD FOLDER — shows typical special tooling set-ups — construction details — cutaway drawings — prices.

WALKER-TURNER CO., INC., PLAINFIELD, N. J.

walker-Turner COMPANY, INC. PLAINFIELD, N.J. U.S.A.

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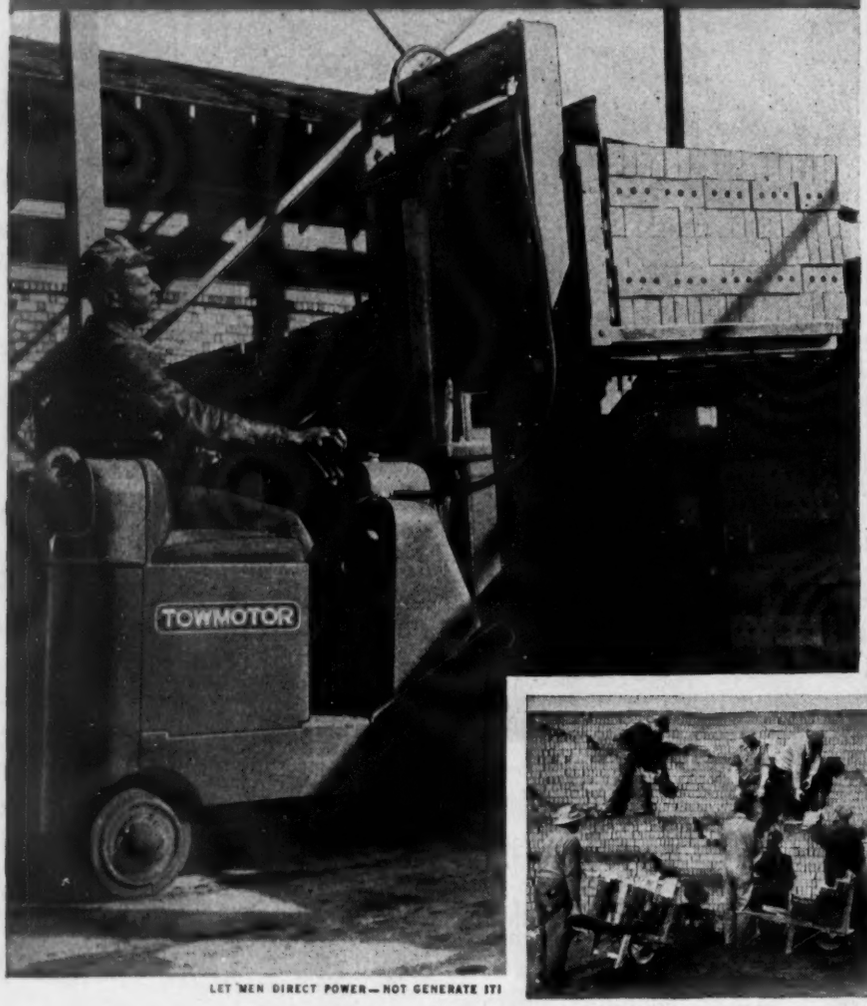
DRILL PRESSES — HAND AND POWER FEED • RADIAL DRILLS
METAL-CUTTING BAND SAWS • POLISHING LATHES • FLEXIBLE SHAFT MACHINES
RADIAL CUT-OFF MACHINES FOR METAL • MOTORS • BELT & DISC SURFACERS

HANDLING + Processing + HANDLING + Assembling + HANDLING
+ Packing + HANDLING + Storage + HANDLING

HANDLING—the Common Denominator of PRODUCTION



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Lower unit costs, made possible through modern mass production methods, increase the necessity for a modern, efficient handling system. Manual handling of low cost units is especially expensive and wasteful and can offset the economies of effective production methods.

Towmotor, *the one-man-gang,* brings mass production efficiency to handling, maintaining the profit margin on products of low unit cost. The Towmotor DATA FILE gives complete details . . . write today for your copy.

TOWMOTOR

THE ONE-MAN-GANG

TOWMOTOR CORPORATION • 1223 E. 152 ND STREET, CLEVELAND 10, OHIO

heat exchangers and the ease with which additional heating surface may be obtained in a majority of cases by recourse to additional pipe length would in most installations make it impractical and unnecessary to employ baffles within the immersion tube. However, where the length of the tube is limited, baffles could be used to increase efficiency and output as illustrated by results obtained on 2 and 2½-in. IPS tubes with pipe baffles as shown in Fig. 5. These show an increase in thermal efficiency of from 5 to 6 per cent with comparatively small restriction of the cross-sectional area of the tubes. Heat transfer obtained with the baffled tubes of 5.5 and 8.54 ft lengths was equivalent to that obtainable with 7.24 and 13.2 ft long tubes without baffles (calculated from equation 1).

As a matter of interest, comparative pressure drops were determined on the baffled 2-in. diameter 5.5 ft long tube and an unbaffled tube 7.24 ft long having the same thermal efficiency at the same input rates. These studies were conducted over a wide range of air throughputs from 10,000 to 29,000 cubic ft per hr. The pressure drop through the short baffled tube was 20 per cent higher than through the longer unbaffled tube. This definitely points to the advisability of using additional tube length in preference to baffles when greater heat transfer is desired since the friction loss through the unbaffled pipe is appreciably less and therefore would permit a higher gas input rating with atmospheric or open pressure type burners.

Units Are Flexible

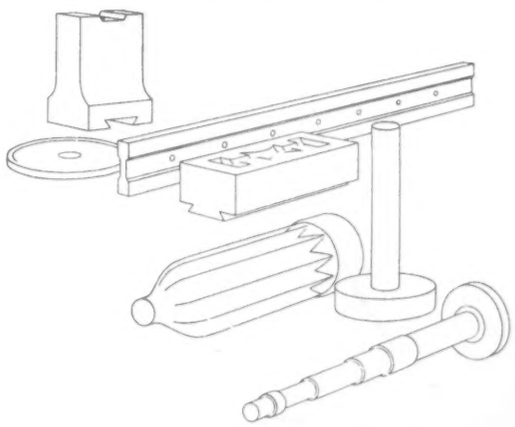
One of the principal advantages of gaseous fuel is its flexibility of operation over a wide range of input rates. This characteristic is particularly valuable in immersion tube heating which may be required at times to provide greatly increased inputs to meet special demands. An enormous increase in input rates can be made with a relatively small decrease in efficiency. This is illustrated by the data presented in Table III.

As will be noted, an average increase in heat output of nearly 170 per cent can be effected with a decrease in thermal efficiency of from 80 to 70 per cent.

In analyzing these data it should be borne in mind that emphasis is given to heat transfer characteristics of the tube. An important collateral consideration is that capacity of the tube and burner must, of course, be designed to accommodate the desired gas rate with complete combustion. In the event it is considered probable that an installation may at some time in the future be called on to provide greater heat output than the original design value, it may be advisable to select a tube diameter and a burner capacity larger than that calculated. Thus, if such a contingency actually materialized, increased gas inputs could be applied with complete combustion.

Heppenstall: the most dependable name in forgings

In charting your course of future business, it's well to remember that Heppenstall Forgings have a time-proved record for extra service . . . Dollar for dollar they'll cost you less to use—Heppenstall guarantees *it . . . Heppenstall Co., Pittsburgh, Pa.*



Your personal war effort is important!

PUSH PRODUCTION • PUSH BOND SALES

Dust, uncontrolled in your plant, is many times more harmful to your equipment and production than it is to the human eye. Why doctor dust-damaged equipment when the cause of the damage can be checked at its source? An American Dustube engineer can quickly show you how to eliminate the costly penalties dust inflicts. He can quickly show how American Dustube Collectors efficiently trap and effect its safe, easy disposal. There is an American Dustube dust collector of a size and type to handle the dust problem that exists in your plant. The last word in improved design, Dustube offers you many advantages through efficient operation, easy installation and inspection. Fewer working parts create a minimum of maintenance.

Improper shakeout is a prime reason for dust collector failure. The diagram "A" demonstrates the efficient Dustube shakeout method. Tubes are limp and deflated, completely subject to the shaking action. Dust is not precipitated on other filters, but is deposited directly into the hopper below. With Dustubes, shakeout periods are shorter and less frequent . . . filter tube wear is decreased.

Figure "B". Dustube Collectors filter air at a rate from 270 CFM to 47,000 CFM and more, depending on the dust problem. Proved collection efficiency by weight is 98% or more.

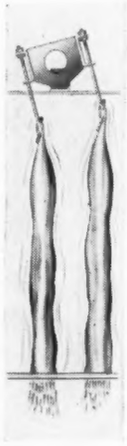


Figure A

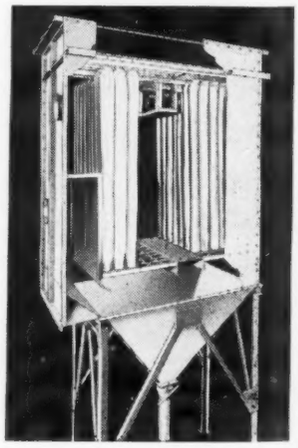


Figure B

AMERICAN
FOUNDRY EQUIPMENT CO.
509 South Byrkit Street
Mishawaka, Indiana

AMERICAN dustube dust collectors

with Centrifugal Castings by Shenango-Penn

BECAUSE Shenango-Penn tubular castings can be finished with a surprisingly thin cut, they are rightly called "thin-skinned". Naturally this means a minimum of waste metal and a saving in machining time—advantages that have proved invaluable to today's wartime production, and no less attractive for the peacetime picture ahead.

For example, as a result of Shenango-Penn's centrifugal process, impurities accumulate at the inside surface of castings where they are quickly and easily removed. Moreover, the castings are accurately concentric and can be controlled to precise dimensions. So savings in time and metal are bound to materialize, either in your own shop or to your equal advantage if you choose to have machining done by Shenango-Penn whose modern machine tools are available for all kinds of precision machining and finishing.

Such savings are not the only advantages of Shenango-Penn castings. You'll find the complete story in free bulletin 143, with full data.

SHENANGO-PENN MOLD COMPANY

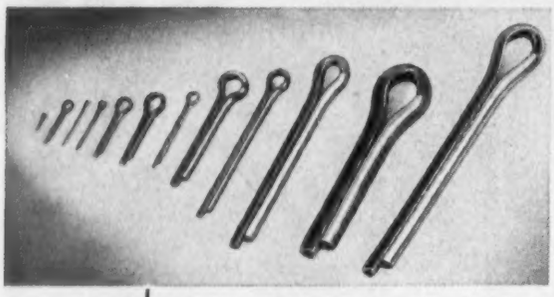
556 West Third Street, Dover, Ohio • Executive Offices: Pittsburgh, Pa.

SHENANGO-PENN

ARMY NAVY

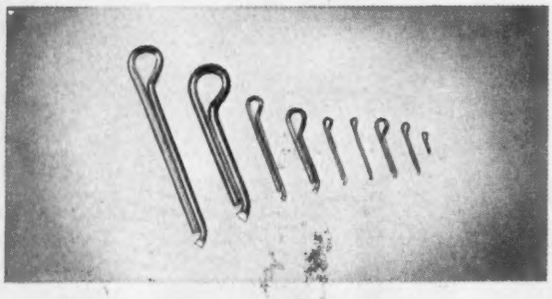
ALL BRONZES • MONEL METAL • ALLOY IRONS

PACKED IN SUBSTANTIAL BOXES—PLAINLY LABELED AND NUMBERED



ACCO—
REGULAR TYPE

CAMPBELL—
HAMMERLOCK TYPE



Acco and Campbell Cotter Pins

• Acco and Campbell Cotter Pins are doing a first-rate job for many essential industries.

We draw our own wire for these good cotter pins to assure uniformity. Their shanks are parallel—and they close all the way to the shoulder. Users sometimes say a blind man could insert these pins.

Other good features: easy, positive locking—quick removal—cleaned by tumbling—packed in substantial boxes with clear, legible labels and numbers.

In addition to regular materials, both types are available in Monel, stainless steel, brass and bronze. Steel cotter pins may be had in electro-galvanized, cadmium plated and coppered finishes.

ACCO

York, Pa., Boston, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Portland, Bridgeport, Conn.

AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

Steels Compared

(*Continued from Page* 116)

the finished forging, except that it was oversize in the vertical dimension (as forged) and a tong hold was added. Castings made from this pattern were then forged in the same die block as the model.

The forging blanks were first cast as shown in Fig. 4, using the blind riser principle of feeding. This was found to give an unsound casting, and to obtain some entirely sound, the risers were changed as shown in Fig. 5. Typical of the heats made are those listed with their compositions in Table V.

Heat No. 0 was cast in a manner to give an unsound casting while the rest were cast sound. The slight amount of forging given these castings tended to close up the shrinkage cavities. The result of the experiments showed that a sound forging blank is desirable.

One cast and one cast-and-forged specimen from each of Heat Nos. 1, 2, and 4 were heat treated as follows:

1850° F — 4 hr — air cooled
1650° F — 2 hr — water quenched
950° F — 6 hr — air cooled.

This left them with a hardness of 331 to 341 brinell. Standard 0.505-in. tensile bars were machined eccentrically from the longitudinaly cylindrical sections of specimens from Heats 1 and 2, and half-size bars from the same location in Heat No. 4 which had been split for macro-etching. Half-size bars were machined from the end sections and standard key-hole notch Charpy bars from both sections.

The data from these bars indicate a small general improvement in the mechanical properties as a result of forging. There was a marked improvement in soundness, but it seemed clear that this improvement could not be relied upon to eliminate defects in unsound castings.

Some pertinent data were obtained while those cast blanks were being forged. The regular forgings were made from 2½-in. sound rolled steel. This stock was sawed into 9-in. long forging blanks. The blanks were heated, and the tong hold forged on as the first operation. After reheating, the forging was completed with a few blows.

A time study showed the following comparison: To saw three blanks from the rolled stock required 20 min on a high speed saw or 30 min on a low speed saw. This is at the rate of 9 per hr or 6 per hr, respectively. Thirty-five blanks are charged to the furnace and require 7 min to heat to 1800° F. It requires 6 min to forge the tong holds on these 35 pieces, after which they are put back in the furnace. By the time the tong hold is forged on the last one, the first is ready for the final forging. It then requires 10 min to finish the forging on the 35 parts. It requires 8 minutes to heat 35 cast blanks to 1900° F, and they can be finish forged in 4 2/3 min.

If only the forging time of one man and one hammer is considered, forgings from rolled stock can be made at the

Aluminum

MEETS THESE REQUIREMENTS for electronic equipment:

Light weight **with sturdiness is necessary, whether the device is carried in a plane or by ground troops.**

Corrosion resistance **provided by Alcoa Aluminum Alloys assures greater dependability under battle conditions.**

Electrical properties **of aluminum—high conductivity, non-magnetic, nonsparking—suit it for electronic purposes.**

Electroplating

IMPROVES ALUMINUM'S NATURAL ADVANTAGES:

Silver plating, **for example, gives higher surface conductivity for high frequency currents employed electronically.**

Soldered assemblies **are possible where surfaces to be joined have been plated.**

Successful plating **on a production basis is an accomplished fact. "Careful control, knowing how, and strict adherence to formulae", are the rules laid down.**

Perhaps you can help

Additional facilities **are needed to increase the production on plating operations. Agencies in charge of procurement say they will welcome the assistance of other companies in boosting output of wartime electronic equipment.**

Alcoa offers you **basic information on plating aluminum which will let you adapt the processes to your plant. If interested, write ALUMINUM COMPANY OF AMERICA, 2112 Gulf Building, Pittsburgh 19, Pa.**

ALCOA

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ALCOA FIRST IN ALUMINUM

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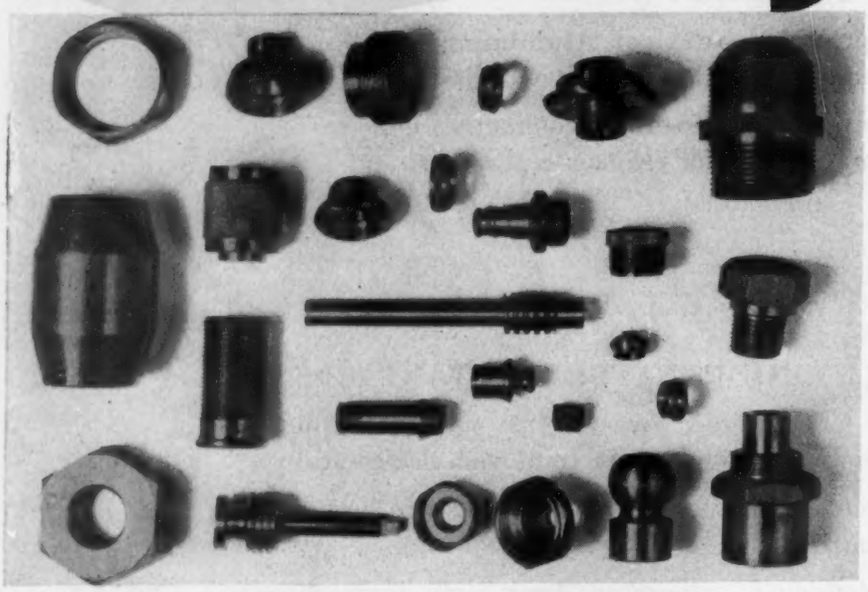

for economy
In Screw Machine Products

• Titan Free Turning Brass and Bronze Rods are recognized for their economies by many manufacturers of screw machine products. While the initial cost may be higher than that of steel, brass permits a production ratio of more than four to one. The tool life on brass is from four to eight times longer than on steel. Brass turnings have a proportionately high scrap value.

Due to its pleasing appearance, brass is often selected for parts which are not to have an applied finish. Where the product requires applied or plated finishes, there is the additional advantage in the use of brass because of reduction in preparation and plating costs.

Our engineers and metallurgists can readily determine the rod with the chemical and physical properties best suited to your particular product. We invite your inquiries for additional information.

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NEW YORK • CHICAGO • NEW ORLEANS • SAN FRANCISCO

Quality Alloys By Brass Specialists

Brass and Bronze Rod • Forgings • Die Castings • Welding Rods

rate of 131 per hr. Starting with cast blanks, they can be made at the rate of 450 per hr.

This, of course, considers only the output of a forging hammer and does not take into account the difference in cost or man-hours of the rolled steel blank and cast steel blank.

Centrifugally Cast Seamless Tubing: As a side issue of the main project, it was requested that the comparative qualities of seamless tubing from centrifugal castings and from pierced billets be examined.

Centrifugally cast hollow cylinders, 4½ in. and 3⅜ in. OD were cast from SAE 4130 steel at the experimental laboratory of the United States Pipe & Foundry Co., Burlington, N. J. These were sent as rough cast to the Globe Steel Tubes Co., Milwaukee, where they were processed into tubing.

The 4½-in. castings were hot rolled to 4-in. and then cold drawn to 3½ in. OD. The 3⅜-inch castings were hot rolled to 2½ in. and then cold rolled to 2 in. OD. Specimens of both tubings were sent to Battelle for examination along with specimens of the regular production of tubing made from pierced billets.

A comparison of the surface condition of the two types of tubing is obtainable from the pictures of the macroetched Figs. 6 and 7. It will be noted that, so far as the outside surfaces are concerned, there is very little difference, but that the inside surface is better on the specimens from pierced billets.

In flattening tests carried out according to ASTM Specification A83-42, Section 5a, both types of 3½-in. tubes showed equally good properties, while both types of 2-in. tubes failed. In a nonstandard reversed flattening, the pierced 2-in. tubes gave a better test. Tension test specimens cut from the tubes showed equal mechanical properties.

Portable Unit Offered for Batching Concrete

An improved concrete batching plant has been developed by C. S. Johnson Co., Champaign, Ill., for use of contractors and engineers requiring fast, accurate batching at construction sites. Batcher may be towed quickly and easily from job to job by an ordinary truck. Erection is simple. It has a 5-cu yd receiving hopper and a 90-ton per hour aggregate elevator. Total bin capacity is 45 tons, with three compartments arranged for two truck loads in each compartment. The portable unit batches into truck mixers, stationary mixers or paver batch trucks. One man control is provided.

—o—

Aluminum rear axle housings weighing as little as 193 pounds have proved dependable in actual road tests, according to Aluminum Co. of America, Pittsburgh 19. Reduction in unsprung weight leads to smoother riding and less wear and tear on equipment and tires.

Make 10 types of prints instead of 1

You can stretch *one* **type of print only so far.**

But when you use Ozalid, you can match the type of print to the job to be done, with the desired material (paper, cloth, foil or film). You can use your printmaking equipment in *all* departments—with different *colors* (black-line, blue-line, red-line, etc.) to identify the prints.

Ozalid gives you this 10-to-1 advantage because it is unique. Only two steps—exposure and *dry* development—produce positive prints direct from tracings, office forms or other originals.

Here are the ten types of prints you can make in seconds with an Ozalid machine:

1. **Black-line** on white paper.
2. **Blue-line** on white paper.
3. **Red-line** on white paper. For shop and office reproductions of drawings, typed material, forms, etc. Different colors can be used for different departments; to distinguish checked from unchecked prints, etc.
4. **Opaque cloth.** For exceptionally durable prints for shop use, permanent file copies, etc.
5. **Transblack Intermediate.**
6. **Sepia-line Intermediate.**
7. **Transparent cloth.** For "duplicate originals" to substitute in print production. Lines can be removed with Ozalid corrector fluid—saving invaluable time in making design changes.

8. **Transparent foil.** For composite or "overlay" prints; for reclaiming old or worn originals; for extra-fast duplicate originals.

9. **Chartfilm.** For lustrous, black-line prints on durable white plastic base. Oil-proof, waterproof. Cleans with damp rag—no protective covering needed. Ideal for instrument panels, identification cards, etc.

10. **Dryphoto.** For almost instantaneous, high-quality reproductions of any photographic subject: in black, sepia, or two-tone effect.

ARMY E NAVY

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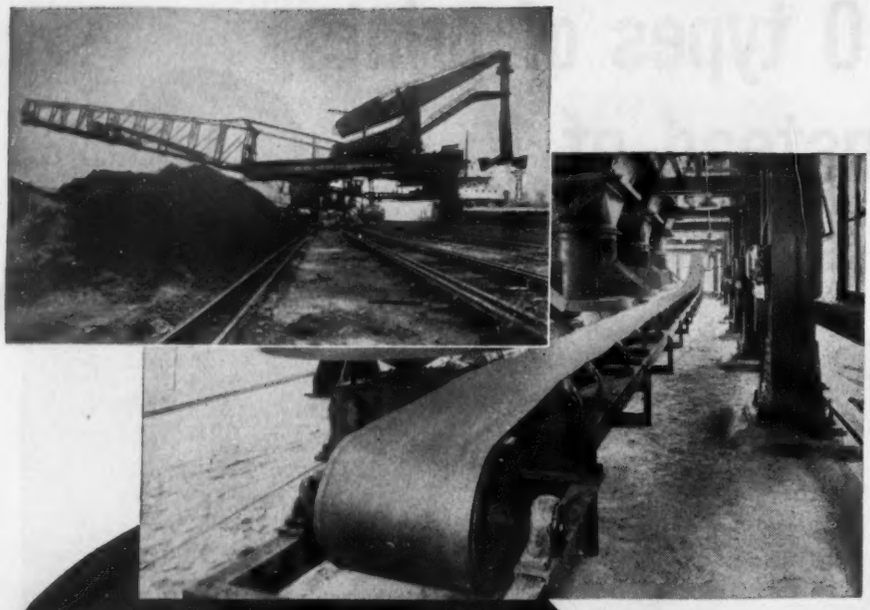

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BELT CONVEYORS
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CONVEYOR
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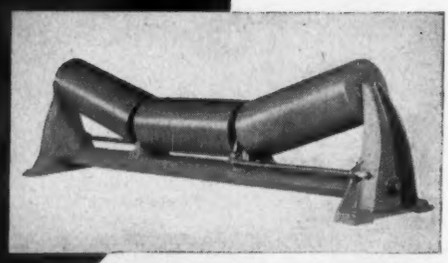

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Individual Oil Quenches

(*Concluded from Page* 122)

around and of such length as to exceed the length of the part by 2 or 3 inches. The inner wall of the sleeve was perforated with holes made by a No. 42 drill spaced ⅜-inch apart and alternate rows staggered.

The part was supported on three lugs to give egress of the quenching medium around the top as well as the bottom of the sleeve. In part of our experiments an additional ⅜-inch space was provided in the middle of the device by making up the sleeve in two parts as shown in one of the diagrams. This latter method increased the rapidity of the treatment somewhat.

This device was built up on a 2-inch Tee for a base making it compact and easily mounted or removed for replacement. The whole mount was over an ordinary quench tank, of course, beside which a centrifugal pump was placed drawing the oil from the bottom of the tank and forcing it up through a 2-inch pipe to the sleeve. A valve in the line placed for hand or foot operation controlled the oil flow.

Increasing Hardness

The part, taken from the furnace, was placed in the sleeve nearby; the oil flow turned on and maintained for a predetermined time. By varying the furnace temperature and the quenching time the desired increase in hardness was obtained.

The design of the sleeve had to be varied somewhat to fit the part being treated and the hardness near the lower end of the part was maintained by directing a stream of oil directly upward from the Tee base against the lower end.

The capacity of the throw of the pump used was found to be important and should always be taken into consideration. It was found in testing that a 100-gallon capacity throw gave a more uniform hardness reading even when used on a single quench sleeve, than did one with a 75-gallon throw. For a group of six sleeves, a 250-gallon capacity throw was planned. Pump capacity depends on the shape of the parts being treated and the number of sleeves that might be operating simultaneously.

For convenience the quench tank was redesigned lower but the capacity kept large enough to provide ample reserve of the medium. The result was that the part could be slipped into the sleeve without any upward reach on the part of the operator.

By this pressure quench method, the advantages of a mild quenching medium are retained, more desirable physical properties are secured, a single operation setup replaces a more complicated one, and increased production is secured.

It can be expected that, as the diameters of the parts treated increase, there will be a limit of successful treatment for a given steel, beyond which a steel of greater hardenability will have to be substituted.

MUSIC WIRE and HIGH CARBON STRIP STEEL

can be substituted for your shortage items!

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A CONTINUING SALE

This continuing sale by Reconstruction Finance Corporation places at your disposal *new* music steel spring wire in excellent condition, and new high carbon, cold-rolled strip steel, in fair to good condition. The strip steel is in many gauges and widths, mostly in coils. The music wire is well-protected, and is available in various gauges, catchweight coils. Both classifications are priced for use as substitutes for many other grades of wire or strip. The music wire is located in Boston, New York, Philadelphia, Cleveland, Chicago, and Pacific Coast regions; the strip steel in the East and Middle West.

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26

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—o—

Masking Stickers—Die-cut to exact specifications, name plate is attached to product covered with Kum-Kleen pre-cut masking sticker, then painted or finished. Stickers are applied without moistening, stick to any smooth surface, are not affected by heat or cold and easily peel off leaving no trace. Avery Adhesives, 451-453 East Third, Los Angeles 13. ST346

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Self-Locking Pins—Designed to replace taper pins, keys, cotter pins, set screws, rivets, etc., they are pressed or driven into standard drilled holes and have four flutes on the surface parallel to axis. When inserted in drilled hole, raised edges are compressed inwardly, providing a resilient, self-locking element. Driv-Lok Pin Co., Chicago. ST378

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Heating Pot—Developed for a variety of low melting point materials, pot is efficient in melting and maintaining liquidity of materials such as shellac, kerosene, turpentine, waxes, fusible metals, and certain types of plastic material. It is electrically heated, completely automatic, permanently wet, fire and explosion-proof and maintains a uniformly low temperature at all times. Kindt-Collins Co., 12651 Elmwood avenue, Cleveland. ST363

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Protective Hood—Designed to give chemical workers protection against all concentrations of nitric, sulphuric, hydrochloric, acetic, hydrofluoric and carbolic acids, hood is made of Cesco Acitex. Clear window provides normal vision and is acid-resistant. Hood covers head, shoulders, chest and back and is tied at waist. Chicago Eye Shield Co., 2300 Warren boulevard, Chicago 12. ST379

—o—

Wetting Agent—For use in water-wash spray booths, compound No. 178, is added in small quantites to circulated water, to reduce surface tension of paint particles and insure wetting. This action aids in throwing particles from air stream, prevents them from adhering to metal surfaces and from clogging pump and piping, and facilitates their collection

EYE for QUALITY
Last Time, Too!

Back in 1918, although courageous pilots sometimes joked that "their crates held together with baling wire and a prayer," our planes were relatively good. Even then, OSTUCO Seamless Steel Tubing was beginning to count as a *quality* factor in aircraft construction. Since that time —yes, since Pearl Harbor—the story of aircraft design development is one of tremendous, "impossible" achievements. OSTUCO's part in this engineering saga is indicated by this fact: OSTUCO Seamless Steel Tubing is now used in every type of plane in the air.

Equally important is OSTUCO's delivery record. "When we've needed material on short notice . . . you have always come through with the impossible," says one famous plane builder. Such comment is typical, and in an industry whose race against time has been phenomenal.

The aircraft industry is one of many in which OSTUCO quality is essential to product strength, performance or service—in which OSTUCO's delivery promptness is vital to production schedules. Back of this record is an ever-vigilant "eye for quality," typified in the photo above by the metallurgical microscope test which minutely checks the steel billet as received. There are many such strict controls throughout OSTUCO's production cycle. This is something to remember in your product planning. Why not call your nearest OSTUCO sales office now and discuss your anticipated problems?

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A prominent aircraft company writes:

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What are these steel spring vibro-isolators? How do they work? How are they installed? Do many concerns use them? What do hammer manufacturers think about them? Can punch presses and other impact machines be similarly mounted?

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Coating—A new protective coating for the sidewalls of wet and dry spray booths facilitates cleanup. A booth so protected is stripped clean by spraying with water or steam, coating and accumulated paint flushing off together. Detrex Corp., 13005 Hillview, Detroit 27. ST348

—o—

Cleansing Cream — Den-Nex removes lacquer, paints, enamels, airplane dopes, varnish, resin solutions, synthetic adhesives, inks and dyes. It is free of abrasive, scouring or clogging substances, and leaves pores open, skin cleansed, soft and smooth. Dennis Chemical Co., 2701 Papin, St. Louis 3. ST 374

—o—

Paraffin—Resinous, flame and moisture resistant and nontoxic, Chlorowax is an ingredient of coating compounds applied as paints and as textile finishing compositions. It is compatible with many plastics and film-forming materials. Diamond Alkali Co., Pittsburgh 22. ST377

—o—

Terminal Block—Designed for greater voltage breakdown requirements in radio circuits, plastic terminal block helps to eliminate possible arcing at high altitudes. Direct shorts from frayed wires at terminals are prevented. It is capable of withstanding a 3000-volt alternating current insulation breakdown test. Paul Henry Co., 2037 South La Cienega boulevard, Los Angeles 34. ST347

—o—

Battery Plug—Designed for heavy duty service, a 600-ampere battery plug, with switching device and two 600-ampere contacts, is adaptable to many applications, wherever engine starting requires 600-ampere circuits. Its mating receptacle is the standard type GB-3-34-CDS receptacle. Cannon Electric Development Co., 3209 Humboldt street, Los Angeles, 31. ST380

—o—

Fountain Brush—Designed with a large fender guard to prevent ink on the bristles from getting on clothing, tables, etc. when laid on its side. Made of aluminum and has a fountain pen action with continuous, controlled ink flow. Diagraph-Bradley Stencil Machine Corp., 3745-55 Forest Park boulevard, St. Louis 8. ST362

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Commercial, Scientific Heat Treating!

We work in all proven processes to give you the best heat treating and to produce the desired results in your metal parts. We are able to choose without favor the treatment best suited to your needs . . . We are neither biased nor do we favor one process over another . . . **only results count to us and to you!**

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CAPACITY: 60,000 pounds per hour
SIZE: 12'3" wide, 38' long
10 oil-fired burners; five at discharge end above billets and five under billets
TEMPERATURE: 1700°F.
Hydraulic pushers. Recuperator to heat air
Automatic temperature control

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BUY WAR BONDS

Photoelectric Control Reduces Pouring Hazards

A photoelectric control called type A20C, made by Photoswitch Inc., 77 Broadway, Cambridge 42, Mass., permits control of the pouring of several ladles of molten metal simultaneously from a remote station. Hazards encountered in hand pouring are eliminated, and several molds now may be poured in less time than was needed to pour one by the former method.

As each of the group of empty molds moves into position before a ladle, a photoelectric control, mounted directly above, scans them through a viewing tube. When molds are in place, the operator, through push button control of the hydraulic actuating mechanism, tips the ladles of molten iron, and white-hot metal flows into the molds. As it reaches the riser of each mold, a brilliant light is thrown off, a signal to the watching "eye" that mold is full. Control instantly drops the ladle back, and pouring automatically stops.

An adjustment on control housing may be set so that control will remain inoperative at one level of illumination, but will be actuated when the amount of light reaching the phototube varies slightly. It thus can be used to indicate and control density of gases as well as turbidity in liquids. This control also is said to be capable of distinguishing between a clear liquid such as water and air above it, or of detecting an interface between two liquids differing slightly in translucency.

The unit operates from a supply of 115 volts ac, 60 cycles, and incorporates a single-pole double-throw relay for normally open or normally closed operation. Relay contacts are designed to handle 10 amperes ac or 5 amperes dc.

Aircraft Electrical System Standards Proposed

Standards work in the field of aeronautical electrical equpment in cooperation with the SAE, NASC, NEMA, the Army Air Forces, and the Navy Bureau of Aeronautics is being done by American Institute of Electrical Engineers under the auspices of the Standards Committee and the Air Transportation Committee. Four subcommittees of the Air Transportation Committee have been set up to carry on important assignments and requests made by other interested organizations.

Aircraft Electrical Systems Subcommittee is to prepare an informative report on "Fundamental Characteristics of Aircraft Electrical Systems." Report will present basic considerations involved in securing the most effective aircraft electrical application technique. It will contain an explanation of fundamental electrical problems, characteristic data for finding the abilities and limitations of devices and apparatus which comprise

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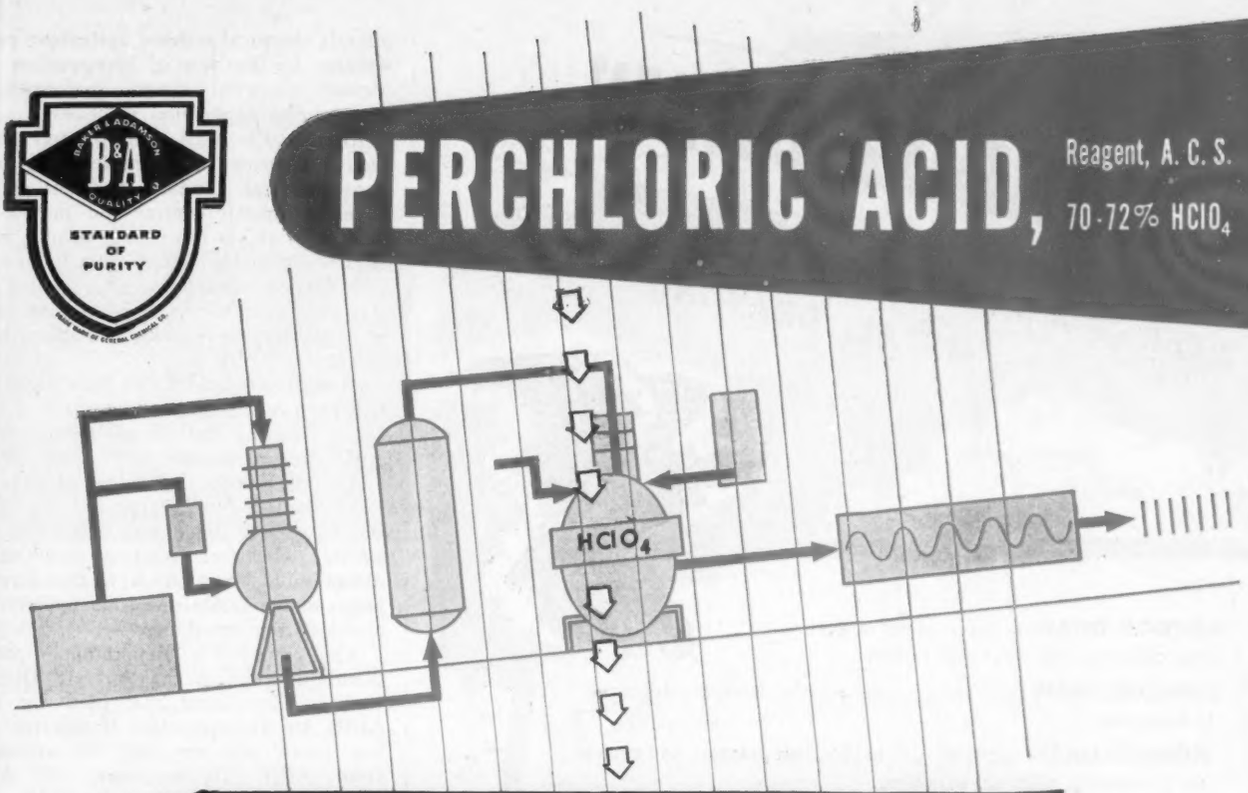

. . . in flow sheets of the future!

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Assay ($HClO_4$) 70-72%

Maximum Limit of Impurities

Nonvolatile	0.003 %
Cl	0.001 %
Total N	0.001 %
NH_3	0.001 %
SO_4	0.001 %
Fe	0.0001%
Heavy Metals (as Pb)	0.0001%
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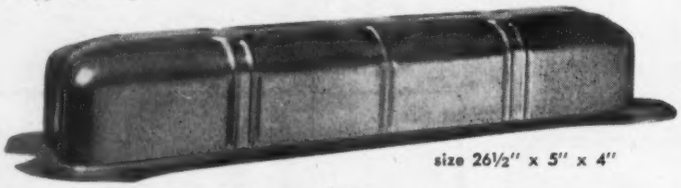
KONDOR DRAW is pleasant to use, easy to clean, non-injurious to workmen.

KONDOR DRAW requires 10% to 15% less pressure and speeds up production with no wrinkling.

KONDOR DRAW will make your tough metal drawing jobs easier and more economical as it did on this job.

HERE WAS THE TROUBLE

Difficulty in degreasing the lubricant used and an average of 8% breakage.



size 26½" x 5" x 4"

20 gauge cold rolled stock, drawn from blank in one operation as shown in unretouched illustration of a rocker arm cover case.

ANALYSIS OF TROUBLE

It was necessary to hand clean each part. Breakage on certain steels required very rigid metallurgical specifications.

RESULTS WITH KONDOR DRAW

With no change in procedure, Kondor Draw was applied. Hand cleaning was eliminated, previously rejected steel was processed with breakage reduced to less than half of one percent.

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aircraft electrical systems, systematic procedures for analysis or computation of aircraft electrical system performance, and general application practices.

Aircraft Electrical Control and Protective Devices Subcommittee will prepare electrical standards and test codes covering aircraft control and protective devices to aid in the rating, testing, and application or evaluation of such for aircraft service. Problems being studied by this group are circuit breaker characteristics and their performance in adequately protecting cables.

Aircraft Wire and Cable Subcommittee will prepare electrical standards and test codes covering the rating, testing, and application of aircraft wires and cables.

Aircraft Electrical Rotating Machinery Subcommittee will prepare electrical standards, test codes, and definitions for aircraft electrical rotating machinery. Attention is being given to the formulation of a suitable test code for aircraft direct current machines.

Also, copies of a "Report on Proposed Standard Voltages for Aircraft Direct-Current Equipment," adopted by the AIEE Air Transportation Committee for one year's trial use, will be available from AIEE Headquarters, 33 West Thirty-ninth street, New York 18.

Special Lubricant Protects Wire Rope

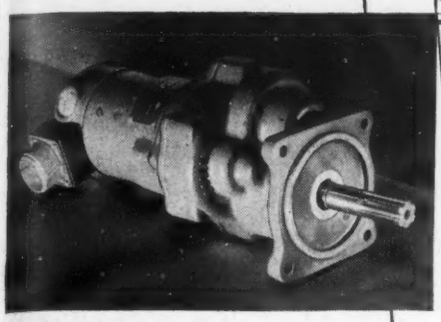
Wire rope covered with a green-colored lubricant has been developed by American Chain & Cable Co., Bridgeport, Conn., for its American Cable and Hazard Wire Rope Divisions. Only highest grade rope, preformed of improved plow steel, will be so lubricated. Non-preformed ropes made of improved plow steel will continue to be identified by a single green strand.

"Green-Lube" has high viscosity and adheres satisfactorily to wire surfaces. It has a grease-like consistency at normal temperatures, and is applied hot and in a molten state by the pressure method, assuring complete coverage of every wire and filling of voids between wires. This makes possible better protection of wires, easier adjustment, and longer adhesion to wires, making for longer rope wear.

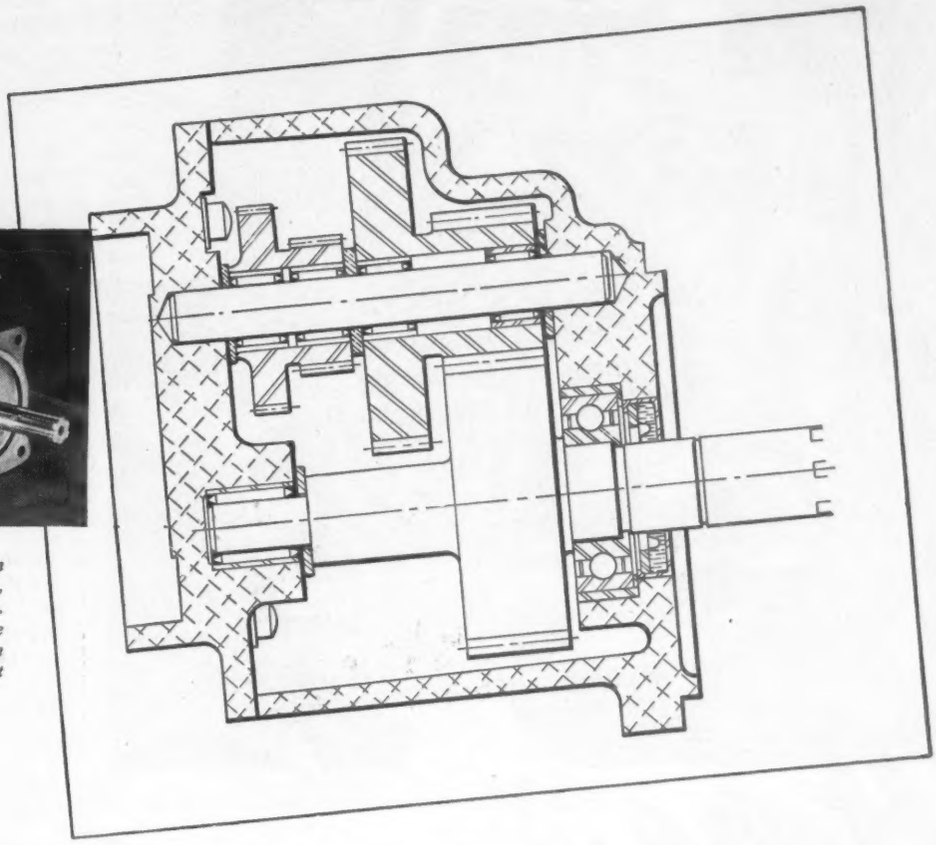
Stress Problems Solved by Analyzer

An "electrical thinker," designed by Westinghouse Electric Corp., East Pittsburgh, to meet new problems in design and construction of turbo-generator units for production of electricity, is said to give answers to mechanical stress problems too complex for mathematical analysis by solving them on an electrical circuit. The heart of the unit, called the mechanical-transient analyzer, includes specially designed low-loss electrical elements, particularly a new type of coil used to produce the effects of a mechanical system in electrical circuit.

In apparatus such as turbo-generators, engineers must know what effect a short



X-section shows 5 of the 7 anti-friction Needle Bearings used on Air Associates, Inc. gear reduction drive for aircraft. This is typical of Torrington Needle Bearing use to get the high anti-friction performance from small design weight and space.

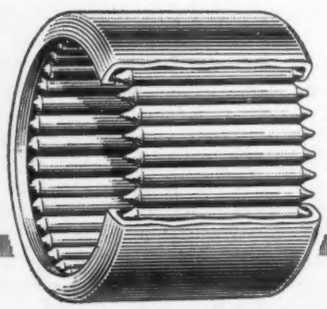


Needle Bearings Give Increased Design and Operating Efficiency to Gear Reduction Drives

Torrington Needle Bearings combine unusually high load capacity into a small, compact bearing with low coefficient of friction that offers many design advantages. That's why, in the widely used gear reduction drive made by Air Associates, Inc. for the retractable landing gears, canopies and other moving parts of so many fighter aircraft, the gears and shafts turn on these modern anti-friction needle bearings.

Torrington Needle Bearings are light in weight and compact, yet engineered to stand up to high speeds and heavy loads. They also permit other weight and space savings in the design of housings and other component parts . . . are easy to install, maintain and lubricate!

Why not have these Torrington Needle Bearing advantages on the tools or machinery you design, build or operate? Our Catalog No. 32-A is packed with useful data on anti-friction Needle Bearing applications ranging from kitchen appliances to textile and agricultural machinery. You should have this helpful data in your engineering and design files. Drop us a line and we'll gladly send you a copy.



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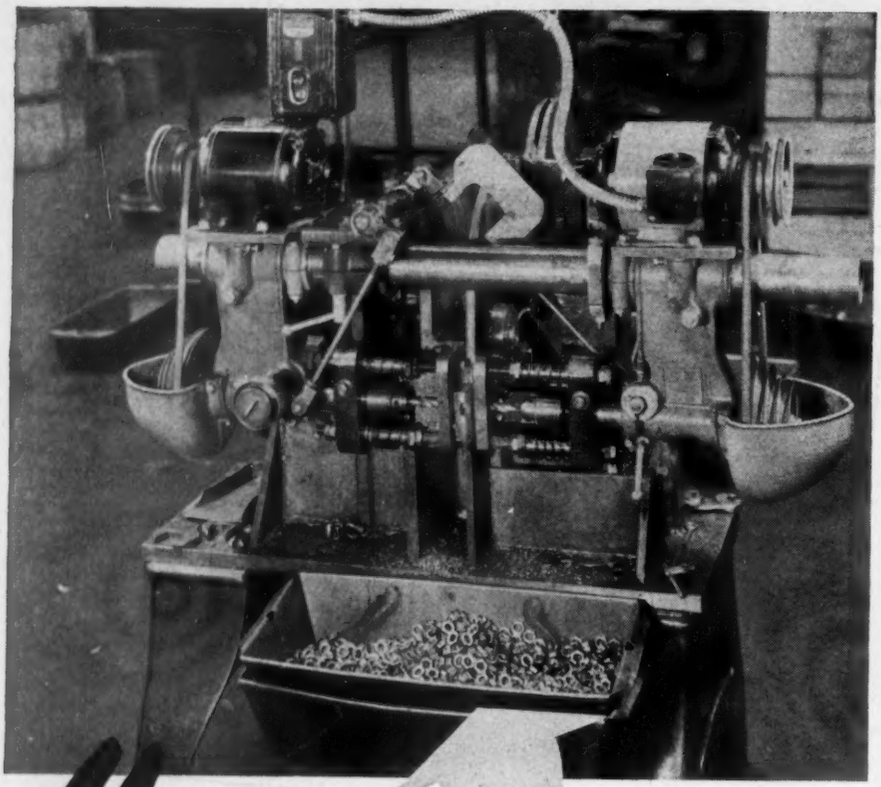
TORRINGTON NEEDLE BEARINGS



Here the extra cost of a special machine is saved.

with stock-model Delta units

A typical war production experience showing how to cut your investment risk in retooling—yet maintain volume and quality:

1. Use standard, low-cost Delta components to build your own high-production, special-purpose machines — quickly convertible to other uses when requirements change.

2. To modernize your present machines that are rapidly approaching obsolescence, replace worn elements with regular, stock-model Delta units.

3. Utilize the portability and compactness of Delta-Milwaukee Machine Tools, to revise or supplement production-line layouts for the best sequence of operations.

MA-21

● Automatic Screw Machine Products Co., Chicago, Ill., was faced with the problem of making fully automatic the countersinking of aircraft nuts before tapping.

Like many another war plant, the firm found the answer in the versatility of Delta-Milwaukee Machine Tools . . . in their ability to operate in any position—upside down, sideways, or at an angle — without lubrication problems.

Two low-cost Delta 14" Drill Presses were mounted "face down" on the same column, to make a high-production machine suited to the specific job requirements.

The former rate for countersinking on a hand-operated machine was 1500 pieces per hour. The special set-up (illustrated) turned out 4800 pieces per hour — more than three times former production!

Delta's savings in cost, weight, and space are not obtained at the expense of quality. They result from advanced design and from quantity production of standard models.

Low-cost Delta units and the ingenuity of your engineers may be the solution to *your* changing production problems. Investigate the many advantages of tooling up with famous Delta-Milwaukee Machine Tools.

Delta MILWAUKEE Machine Tools

Delta's 76-page Blue Book provides case histories of 140 production ideas that got results. Helps you more clearly visualize the almost unlimited money-saving applications of Delta-Milwaukee Machine Tools. Also available is a catalog of these low-cost machine tools. Request both, using coupon below.

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Please send my free copies of Delta's 76-page Blue Book and catalog of low-cost machine tools.

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circuit will have on the shaft and other mechanical parts when the smooth and co-ordinated running of apparatus is upset. Severe stresses occurring when orderly operation of machinery is interrupted, the effect on parts, such as the shaft, is similar to a brake being applied suddenly to one of four wheels of a speeding car. If there is a breakdown in the equipment, lasting for only a fraction of a second, because it isn't built for peak stresses, a power station may be in for serious trouble.

With the newly developed analyzer, it is possible to determine the worst conditions under which the apparatus might operate and carry out the design in line with such data, according to the company. From results of the electrical test, an equation is obtained, and it is applied to the problem of the mechanical system under test. Without the analyzer, many problems of determining the peak stresses of turbine-generator shafts are too complex for ordinary mathematical solution.

This device also may be used for almost any mechanical stress problem, including determination of peak stresses in an airplane at the onset of "flutter" when a plane reaches the speed of sound from 740 to 760 miles per hour, and the "rideability" of an automobile.

Compounds Prevent Engine Casting Leaks

A new series of Thalid compounds, used to impregnate magnesium and aluminum aircraft engine castings for prevention of liquid and vapor leaks, has been developed by Monsanto Chemical Co., Plastics Division, Springfield, Mass. Material is reported to provide maximum sealing effectiveness with full adaptability to sealing castings on a production line basis. Threatened bottleneck, caused by shortage of tung oil, thus far has been averted.

Thalid X100 series resins, used as casting sealants, are thermosetting solutions, a mixture of base resin and styrene monomer. By varying the ratio of the two, viscosity of impregnating solution can be controlled to meet varying requirements arising from variation in the size of porosity in aluminum and magnesium. Solution is applied by positive pressure of vacuum-pressure impregnation.

Following impregnation, castings are put through a heating cycle which thoroughly cures the resin to a slightly rubbery condition within the pores of the metal. Parts subsequently may be machined, although casting usually is fully machined before impregnation with the compound.

Cured sealant is said to have satisfactory stability under high engine temperatures and resistance to lubricating oil, hydraulic fluids and cooling solutions. Bulletin X100-2, fully describing the new sealant, is available from the company by application on official letterheads.

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Plastiron
Plastalloy

Specialized mold steels that meet exacting manufacturing requirements

Plastiron is of low carbon content, melted and hot-worked with great care, and is as clean and soft as the steel-making art can produce. It is exceptionally easy to hob, and is ideal for intricate shapes and short runs.

Plastalloy is a low carbon, nickel chrome steel of finest mold quality. It is annealed to provide ease of hobbing, and it develops an extremely hard, deep case, having high resistance to swamping and erosion.

Each is produced by modern steel practice from carefully selected ingredients, in electric furnaces, and under careful control. Each provides these important advantages:

- A low carbon content
- Thoroughly clean and uniformly sound
- Produces unusually smooth cavities
- Will withstand extreme hobbing
- Carburizes evenly
- Ideal for difficult shapes

Disston engineers will be glad to help you with your postwar plans

The wide experience of Disston engineers and metallurgists with the plastics industry is at your service. You may feel free to consult them at any time regarding your mold problems. They will be glad to cooperate with you, advise you frankly, and without obligation. Write fully, and in confidence.

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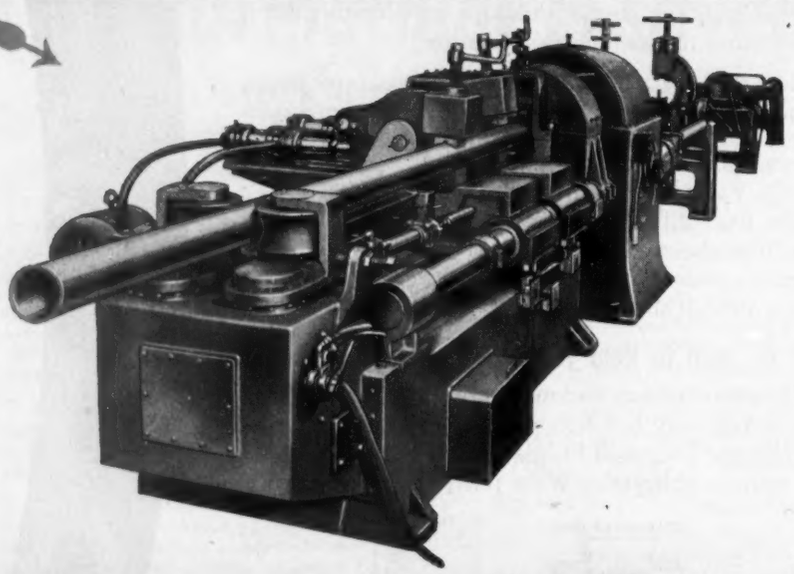
BAR & TUBE TURNERS

For speed...and for precision! Continuous, automatic feeding gives you high production unequalled by any other type of turning machine! For both rough peeling and finished precision conditioning, Medart Centerless Bar Turners will turn bars and tubes at maximum rate obtainable from any present day cutting tools. The machines are very flexible. May be used with one or two cutterheads, with one or up to eighteen tools in each head.

"Patents make Jobs"



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New Literature

RADIANT HEATING

By A. M. Byers Co., Pittsburgh.
(A 52-page book, illustrated, tables). For designer and fabricator. Topics include figuring heat losses and piping requirements, designing coils, supply and return mains, relative merits of locating coils in floor and ceiling. Also contains 23 typical installations covering wide range of structures. Tables are reproduced showing heat transfer properties of various piping materials. There also is a section on pipe bending and welding.

—o—

DIE STEELS

By Firth-Sterling Steel Co., McKeesport, Pa.
(Two pages, illustrated, in color.)
Describes 14 HWD and Cromovan controlled-quality steels for hot and cold work, with performance records from a wide variety of applications.

—o—

ALL-WELDED STEEL HEATER

By Kewanee Boiler Corp., Kewanee, Ill.
(Four pages, illustrated, in color.)
Listed are specifications, measurements and ratings for five sizes of Kewanee heaters, standard and extra-heavy. Brief history of development of Tabasco heating unit and exposition of improved base and rocking grate included.

—o—

STEAM POWER PLANT PLANNING

By Westinghouse Electric Corp., Pittsburgh 30.
(A two-part 40-page booklet (B-3153), illustrated, with charts.)
Part I describes types of turbines and lists sizes and speeds. Part II covers basic operating conditions, including effect of deviation in pressures and temperatures at heat rates, regenerative feed-water heating, recommended condenser sizes and dimensions, condenser friction, impeller, propeller and axial type circulating pumps, and condensate pumps.

—o—

ELECTRONIC PRODUCTS

By North American Philips Co., 100 East 42nd street, New York 17.
(An 8-page catalog, illustrated, in color.)
Subjects, all Norelco products, are: (1) Cathode-ray, transmitting, power and amplifier tubes; (2) quartz crystal oscillator plates; (3) Searchray (X-ray) inspection units; (4) Geiger-counter X-ray spectrometer; (5) film-type X-ray diffraction equipment; (6) quartz crystal X-ray analysis unit; (7) metallurgical products —tungsten and molybdenum powder, rod, sheet and wire. Also aluminum

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Announcing

THE NEW BRUSH ROUGH-FINISH MEASURING PICKUP AND DRIVE HEAD

A perfect complement for the Brush Surface Analyzer is the new Rough-Finish Measuring Head. Developed to meet the growing need for the checking of rougher surface finishes and waviness, it accurately measures irregularities from 100 to 3,000 microinches, peak to valley.

This new Pickup (Model BL-101) and Drive Head (Model BL-102), when used with the Brush Surface Analyzer, extend its usefulness and range of measurement from 1 to 3,000 microinches.

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alloy, enameled copper, resistance, silver and gold-clad silver wire in fine sizes; (8) medical X-ray equipment.

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ELECTRONIC CONTROLS

By Wheelco Instruments Co., 537 South Dearborn Street, Chicago 5.

(A 12-page catalog, Z-6300.)

Describes electronic principle by which control is effected without contact between measuring and control units of instrument, as well as indicating pyrometers and pyrometer controllers, indicating resistance thermometers and resistance thermometer controllers, input controllers, program controllers, portable potentiometers, combustion safeguards, and thermocouples.

—o—

HELIX END MILLS

By National Twist Drill & Tool Co., Rochester, Mich.

(A 16-page, illustrated booklet.)

Describes new tools designed for milling slots, keyways and pockets where ordinary arbor type milling cutters cannot be used. High helix angle of cutting edges and general free cutting construction make possible smooth and efficient operation at high speeds.

—o—

DUAL RAM BROACHING MACHINES

By Colonial Broach Co., P. O. Box 37, Harper Station, Detroit 13.

(A 4-page, 2-color folder, VAD-44, with tables.)

Describes standard line of improved broaching machines, designed for surface broaching to provide maximum output combined with continuous high precision. Included are a case history illustrating flexibility in use of machines, specifications and dimensions.

—o—

ELECTRODE COMPARISON CHART

By Allis-Chalmers Mfg. Co., Milwaukee 1.

(An 8-page bulletin, B6344A.)

Compares equipment from 22 electrode manufacturers and contains information on stainless steel and hard surfacing electrodes, as well as the mild steel type. A section is devoted to a typical weld deposit analysis of stainless steel electrodes, showing percentages of chromium, nickel, carbon, columbium, and molybdenum.

—o—

STAINLESS STEEL FASTENERS

By Allmetal Screw Products Co., 33 Greene Street, New York 13.

(An 83-page engineering catalog.)

Designed to aid in selecting the right size and type of noncorrosive fastening device for a particular job. Includes a brief introduction concerning stainless steel, stock sizes and physical dimensions of various bolts, cap screws, nut and pipe fittings, special screw machine

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HALCOMB STEEL COMPANY	"REX T-MO"
JESSOP STEEL COMPANY	"MOGUL"
LATROBE ELECTRIC STEEL COMPANY	"TATMO"
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For the full story on MO-MAX **molybdenum-tungsten** high speed steels—their physical properties, their advantages, and how to heat treat them—write today to Department C for the new 1945 MO-MAX Handbook.

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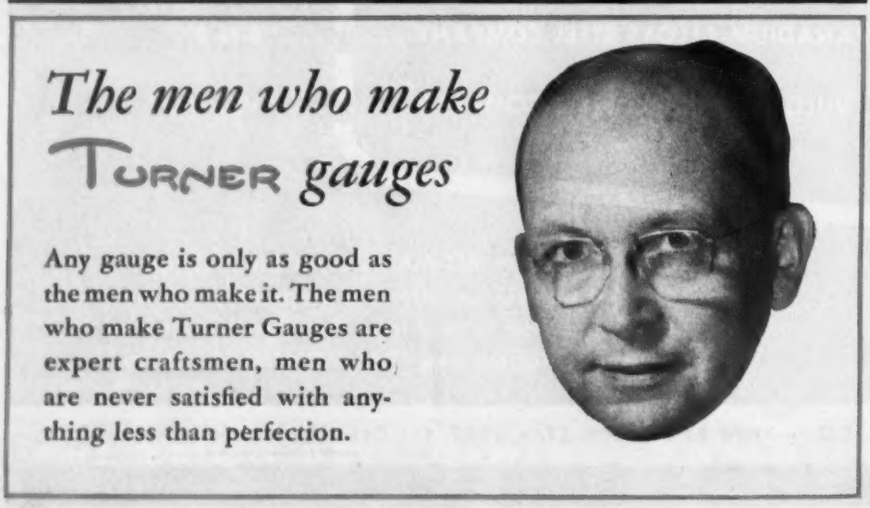
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TURNER gauges
Any gauge is only as good as the men who make it. The men who make Turner Gauges are expert craftsmen, men who are never satisfied with anything less than perfection.

parts that can be made to order, and a section containing engineering tables and data.

—o—

FUTURE OF WELDING

By Victor Equipment Co., 844-54 Folsom street, San Francisco.

(An 18-page booklet, Form 50, in color, illustrated.)

Describes the plant and facilities, the background, present status, and future of welding, and the diversified line of welding equipment and supplies made by the company.

—o—

FASTENING DEVICES

By Parker-Kalon Corp., 194 Varick street, New York 14.

(Catalog with illustrations and tables.)

Describes self-tapping screws, socket screws, and other fastening devices and contains illustrated instructions on where and how to use them.

—o—

HYDRAULIC SLOTTERS

By Rockford Machine Tool Co., 2500 Kishwaukee, Rockford, Ill.

(Illustrated bulletin.)

Contains specifications for 12 and 20-in. stroke models. The 20-in. stroke model is a new size, similar to the 12-in., except that the column is raised and stroke length increased. This model, designated Hy-Draulic Slotter, also has stroke length control dogs mounted on side of ram.

—o—

WIRE AND STRIP MILL FURNACES

By W. S. Rockwell Co., 50 Church street, New York 7.

(An 8-page catalog, No. 418, with illustrations and drawings.)

Describes batch loading or continuous types of gas, oil and electric furnaces for annealing, bright annealing, clean annealing, galvanizing, hardening, heating, normalizing, patenting and tinning.

—o—

METAL CUTTING TOOLS

By Chicago-Latrobe Twist Drill Works, 411 West Ontario street, Chicago 10.

(A 6-page pamphlet.)

Describes cutting tools, including twist drills, reamers, and counterbores, and gives information regarding their suitability for various types of materials. Lists regular sizes manufactured and obtainable from stock.

—o—

WIRE BELT HOOKS

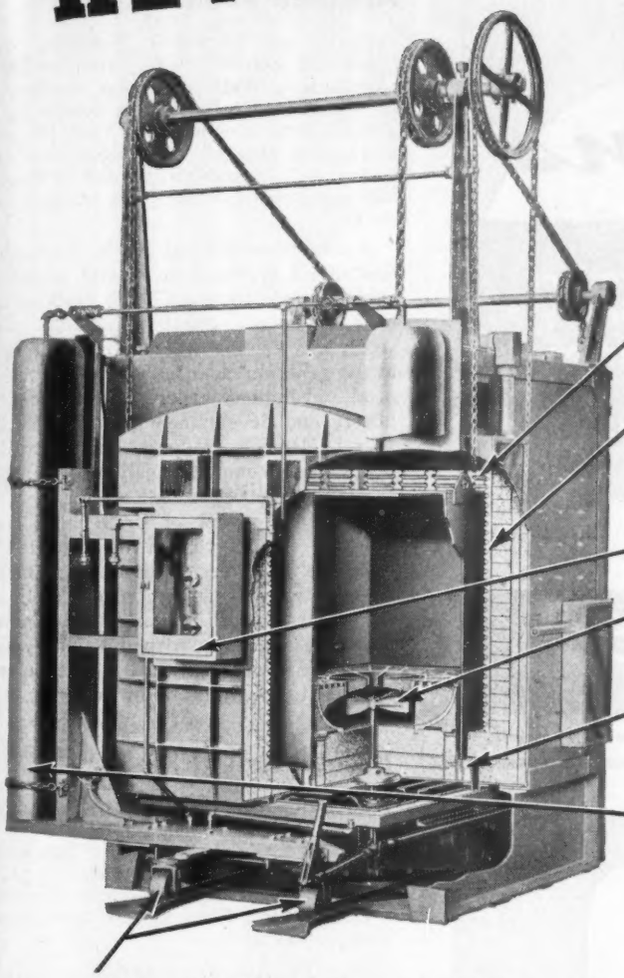
By Bristol Co., Mill Supply Division, Waterbury 91, Conn.

(Illustrated bulletin)

Shows method of applying hooks to all type of flat belts. Also includes specifications and prices.

All publications described here are available without charge unless otherwise noted.

HEVI DUTY CAR TYPE NITRIDING FURNACE



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Zoned Temperature Control

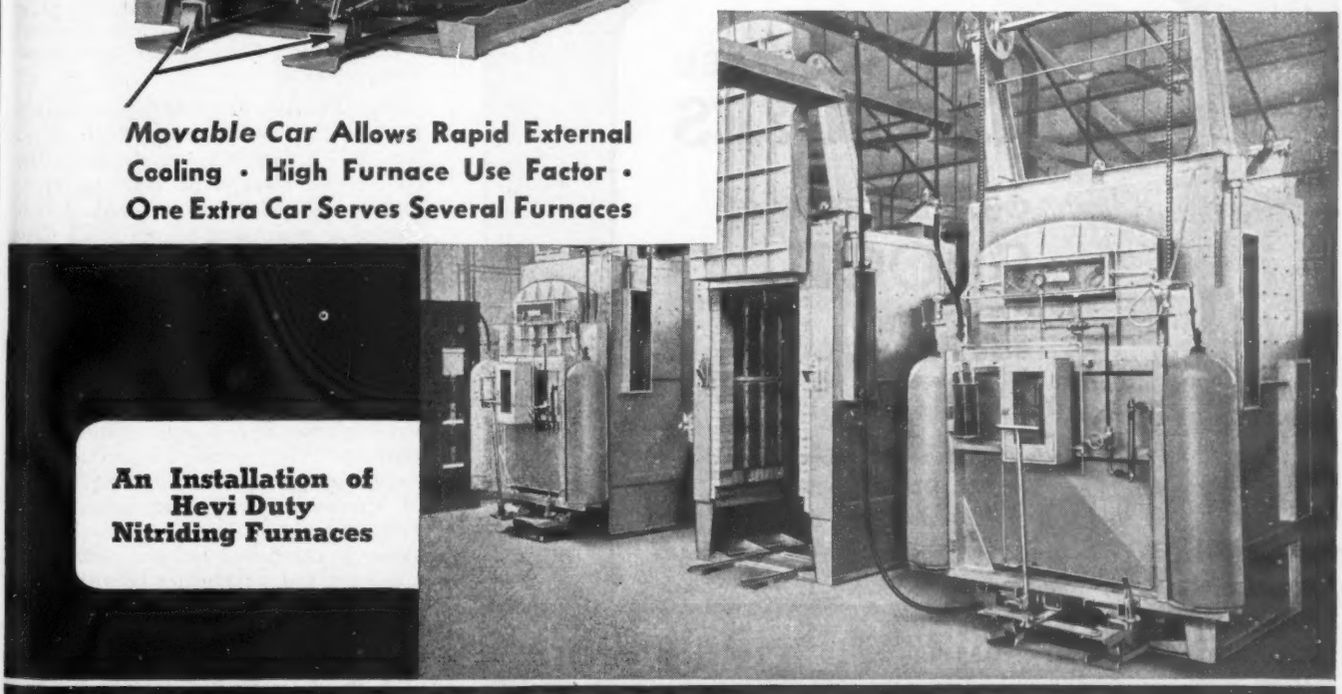
Dissociation Testing Cabinet or Ranarex Instrument on the Car

Large Circulating Fan

Sand Sealed Retort

Ammonia Bottles on Car

Movable Car **Allows Rapid External Cooling · High Furnace Use Factor · One Extra Car Serves Several Furnaces**



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HEVI DUTY ELECTRIC COMPANY

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Book Notes

Portfolio of Tanks and Armored Vehicles

Tanks and Armored Vehicles, by Lieut.-Col. Robert J. Icks, Ordnance Department; edited by Philip Andrews; published by Duell, Sloan & Pearce Inc., 270 Madison avenue, New York 16, for $4.75 plus postage; 264 pages, 9 x 12 inches, 432 illustrations; printed in sheet-fed gravure and letter press on antique stock.

A comprehensive and graphic presentation of all types of tanks and armored vehicles built by the United Nations as well as enemy countries through the years, this volume will prove of interest to the general reader as well as the technical and military expert. Chapters cover history and development prior to World War I, elements of design and construction, and a complete analysis of equipment by countries.

While the review of U. S. tanks and armored cars is carried through 1942, there are a number of examples of more recently developed equipment, such as the M-26 General Pershing 45-ton tank, as well as numerous experimental types, which are not included. Five of these are referred to briefly in an addendum.

Basic Reading Kit for Helping the Foreman

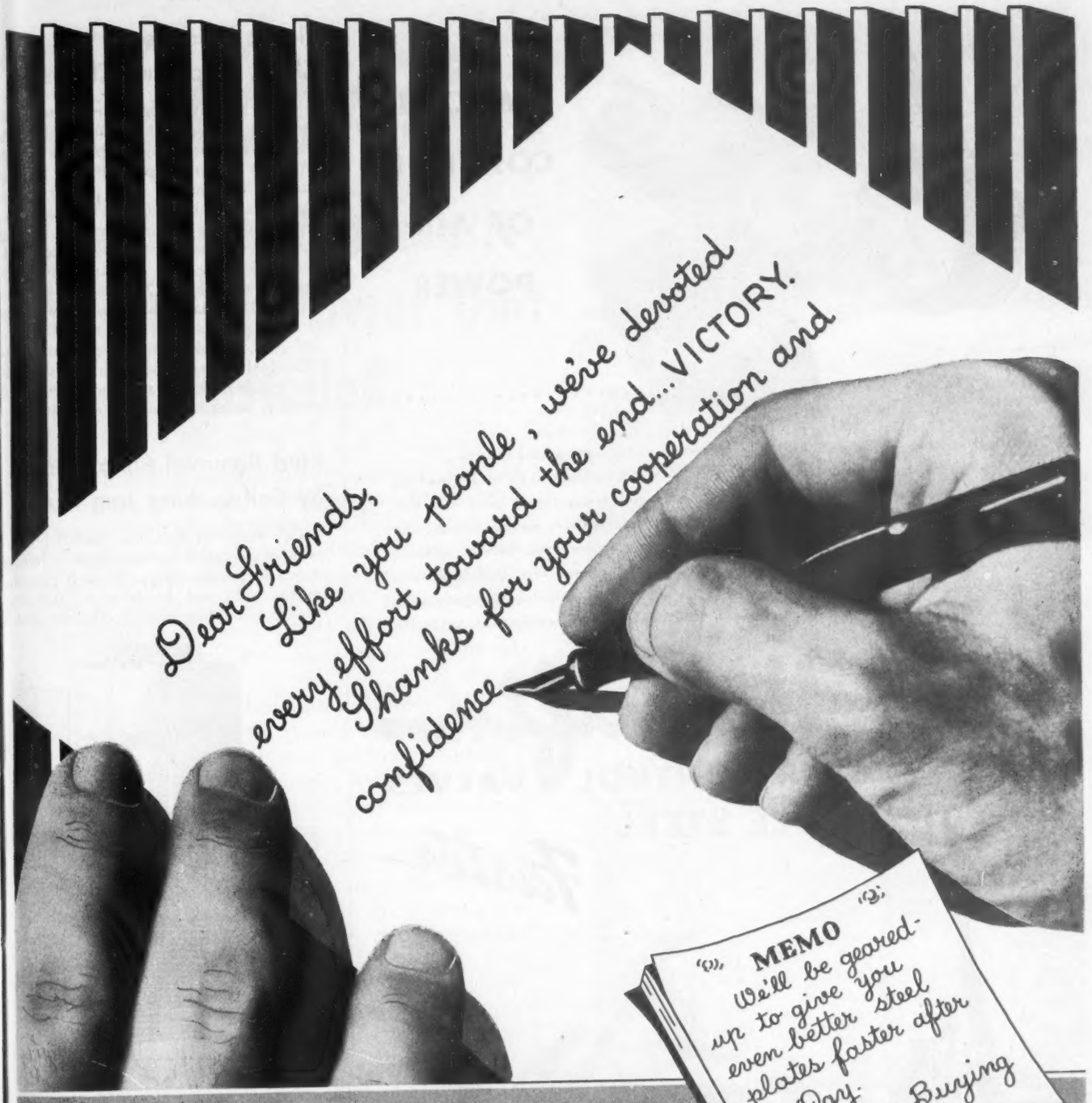
Foremen's Basic Reading Kit, fabrikoid, 213 loose-leaf pages, 6 x 9 inches; published by American Management Association, 330 West Forty-second street, New York, for $3.50.

This volume is an effort to place within reach of the foreman a large body of information of high value in giving the latter the best ideas of his place in representing management to the worker. It is offered as useful and helpful to all foremen who desire to succeed as managers and to develop their own resources as a step toward further success in the world of management.

The initial chapter deals with the foreman's role in management and goes on to discussion of understanding people in work relationships, human relations, improvement of morale, supervision of women on production jobs, supervision of apprentices and other subjects. To help appraisal of the foreman by himself there is included a foreman's discipline check list and a foreman's balance sheet.

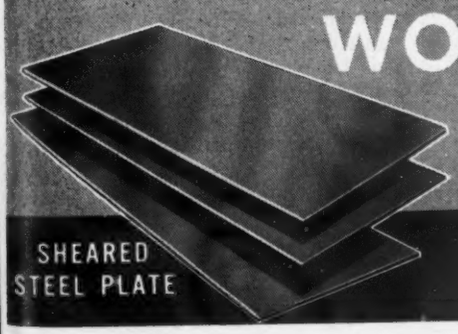
—o—

A circular slide rule for use in computing the approximate hardenability of steel from its chemical composition and grain size in accordance with standard formulae has been designed by metallurgical engineers of Steel and Tube Division, Timken Roller Bearing Co., Canton 6, O. It may be obtained by request on company letterheads.



Steel Plates to Navy Department Specifications—U. S. Navy Department Hull and Boiler Steel—Tank and Structural Steel—Marine, pressing, copper bearing and flange steel—Ordinary Fire-box, Still Bottom and Locomotive Fire-box Steel—Hull Plates to Lloyds and American Bureau Specifications.

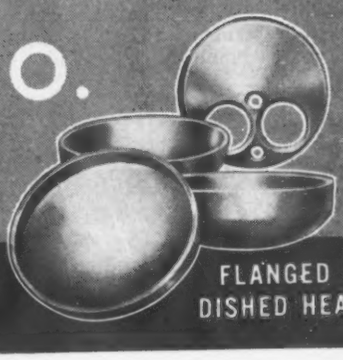
Complete spinning equipment for Flanged and Dished Heads from 9½" to 216" O.D.—and from 3/16" to 4" thickness—any size or type to Standard A.S.M.E. or A.P.I. Specifications.



WORTH STEEL CO.

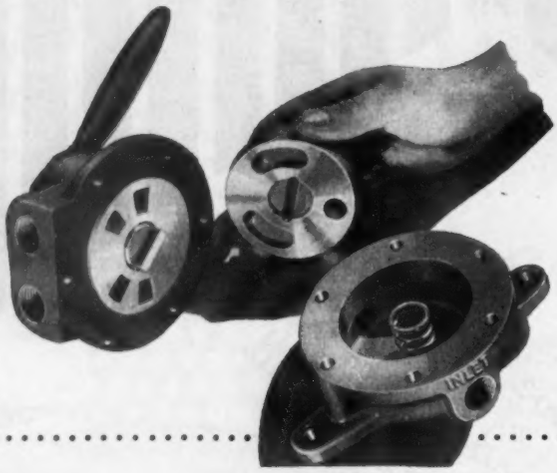
CLAYMONT DELAWARE

WORTH



SHEARED STEEL PLATE

FLANGED & DISHED HEADS



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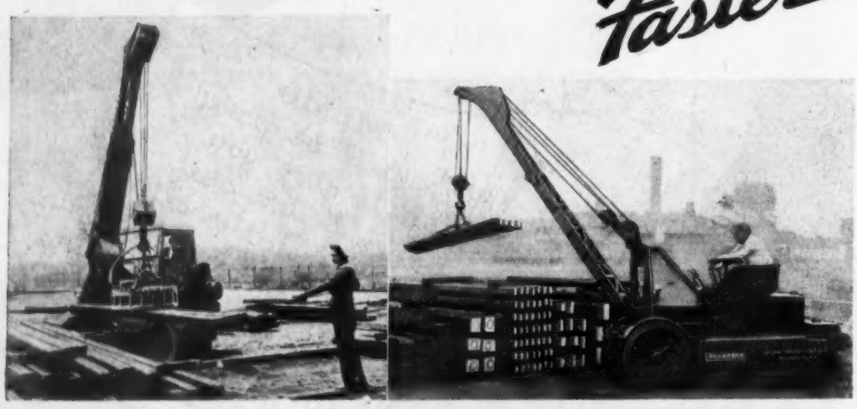
With Hannifin "Packless" Air Control Valves you get the smooth acting, positive control of air operated equipment that means better performance and maximum use of air power. Disc-type design, with the bronze disc ground and lapped to make a perfect seal with the seat, does away with packing, provides lasting leak-proof operation and smooth acting control.

Hannifin Air Control Valves are made in 3-way and 4-way types, hand and foot operated, manifold, spring return, and heavy duty rotary types. Write for cylinder and valve bulletin with complete data. Hannifin Manufacturing Company, 621-631 South Kolmar Avenue, Chicago 24, Ill.

Hannifin

AIR CONTROL VALVES

HOW TO HANDLE STEEL *Faster*



Move a KRANE KAR up to a pile of forgings, bars, blooms, billets, ingots, castings (or a scrap heap when equipped with an electric magnet), and top the boom with the full load. Transport load forward or backward and position it on either side in places inaccessible to a rigid boom crane. Make speed with the all-around safety features—stability without jacks or outriggers; automatic braking of boom and load, easy steering, and utter simplicity of operation. Write for catalog No. 58.

USERS: Carnegie-Illinois; Bethlehem; Republic; General Motors; Consolidated; American Smelting & Refining; Lima Locomotive Works; etc.

Agents in Principal Cities

THE ORIGINAL SWING BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

2½, 5, AND 10 TON CAPACITIES

KRANE KAR

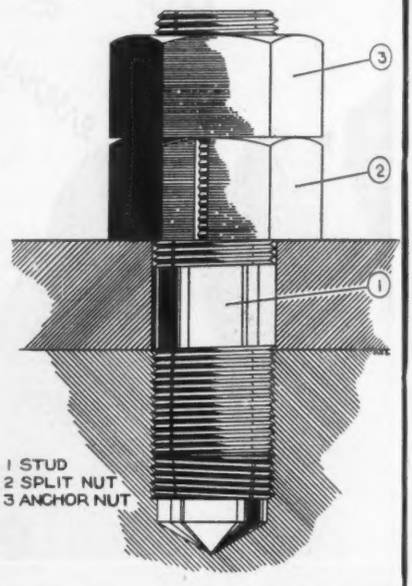
SILENT HOIST & CRANE CO., 849 63RD ST., BROOKLYN 20, N.Y.

Plastic Instruments Check Maps and Charts

Aerial photo interpreter instruments for checking and analyzing maps and charts are manufactured by a process which produces accurate photographic reproductions on Vinylite rigid plastic sheets, a product of Bakelite Corp., 30 East 42nd, New York 17. Process involves coating plastic sheets with a photographic emulsion, imprinting, then overlaminating with Vinylite resin film. Dimensional stability of the sheets is said to insure retention of initial accuracy of the instruments under all conditions. Instruments are non-inflammable, fadeproof, and resistant to oils, greases, water, and most acids and alkalies, according to the company.

Stud Removal Simplified By Self-Locking Jam Nut

Two standard nuts, one slotted lengthwise, are backed against each other as shown in the drawing. Wrench pressure on the split nut binds it to the stud threads, providing extra friction by which



the stud may be removed. The second nut serves as an anchor. Studs are removed without damaging threads by this method at the Erie Works of General Electric Co.

Paints Tested for Service on Galvanized Iron

An unusual test of 21 paints on galvanized iron sheets of a granary in Illinois is one of a series conducted by American Zinc Institute over the past 10 years to compare service properties of metallic zinc paints with those of other paint coatings on galvanized iron. Sheets on granary were painted in 1934, and the report claims that only three paints present a good appearance today: One coat of metallic zinc paint with about 10 per cent of film gone; two coats of metallic zinc paint with some pin holes showing.

ANOTHER

G-E Fully Automatic Anodizing Power Unit Installed

This large automatically controlled power unit for 5000-ampere 40-volt chromic acid anodizing was recently installed in one of our largest B-29 bomber manufacturing plants. Essentially, the unit consists of eighteen G-E "2000" large capacity copper-oxide rectifiers, a motor operated control with its accessories and an operator's panel.

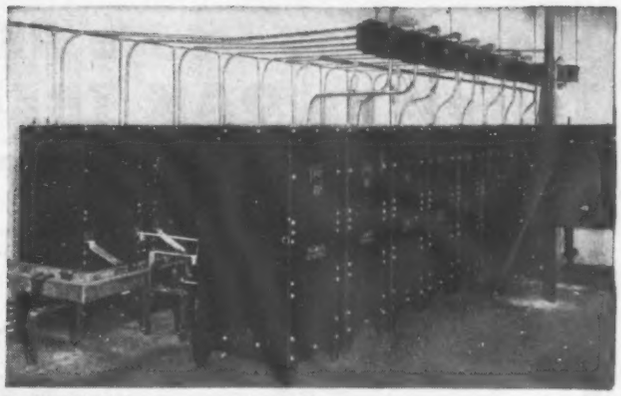
To anodize, the plater simply presses the start button on the operator's control panel. Thereafter the whole anodizing process is fully automatic. When the anodic film is formed the unit shuts off automatically and returns to starting position for the next load. No adjustment is required regardless of the size of load. Voltage build-up in relation to the formation of the film is positively controlled. All chance of overloading the equipment is eliminated. G-E fully automatic power equipment completes the anodizing in the shortest possible time.

For modern anodizing needs, select your power equipment from the G-E line. There are many different rated units from which to choose. Detailed data on request from Section A65 1-90, Appliance and Merchandise Dept., General Electric Company, Bridgeport, Conn. Write today.

Hear the General Electric radio programs: "The G-E All Girl Orchestra" Sunday 10 P.M. EWT, NBC. "The World Today" news Monday through Friday 6:45 P.M. EWT, CBS. "The G-E House-party" Monday through Friday 4:00 P.M. EWT, CBS.

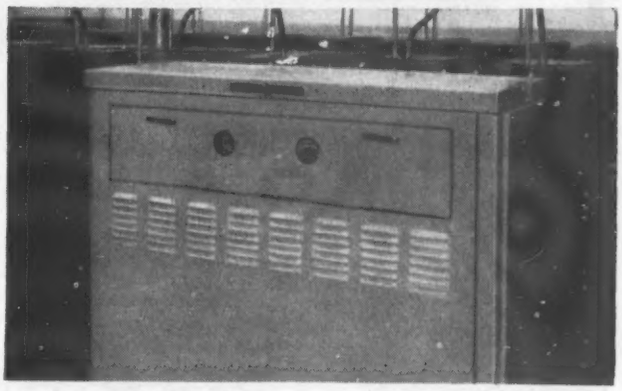
BUY WAR BONDS AND KEEP THEM

GENERAL ELECTRIC



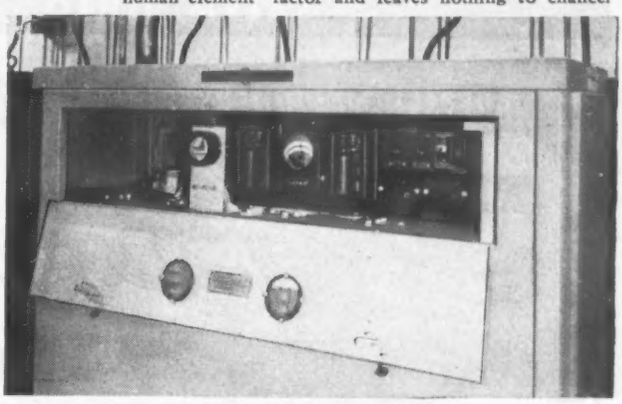
RECTIFIERS

Eighteen G-E "2000" Copper-oxide rectifiers connected in parallel provide output of 5000 amperes 40-volts d-c.



RECTIFIER CONTROL

Fully automatic, easy to use, reduces labor costs. Eliminates "human element" factor and leaves nothing to chance.



RECTIFIER CONTROL ACCESSORIES

Open view of control showing the contact-making voltmeter, the transfer relay, the timer and other accessories.

OPERATOR'S CONTROL PANEL

Located near the tanks for operator's convenience is complete with start-stop push buttons, indicating instruments, recording voltmeter, etc.

(Photographs courtesy of LaSalco Inc.)

Would You Use a PENKNIFE To Fell an OAK TREE? . . . .

. . . of course not! Modern shop practice demands the greatest possible efficiency from the best tools available. PAXSON Slitters are designed to YOUR specifications. Slitters of Pull-thru or Driven type, with Pay-off and Coiler Reels. Why not assure your plant of modern equipment! Write us today for complete details on these exceptional machines.

Engineers and Builders of Cold-Rolled, Strip-Mill Equipment Since 1927

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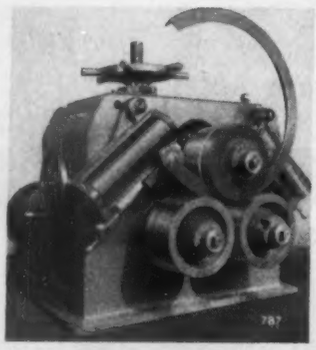
SPECIAL MACHINERY BUILT ON CONTRACT

BENDING AND STRAIGHTENING MACHINES

PUNCHING AND SHEARING MACHINERY

THOMAS *Bending* **ROLLS**



"for angles, tees, flats, channels, squares, etc.

THOMAS BENDING ROLLS are available in horizontal or vertical types and a variety of sizes. Correctly designed and sturdily built, these machines will render many years of fast, accurate service at a minimum of operating and maintenance expense.

Our bulletin No. 314 gives complete details. Write.

THOMAS

MACHINE MANUFACTURING COMPANY

6

PITTSBURGH, PA.

less than 5 per cent; and one coat of metallic zinc paint which originally had a top coat of aluminum paint. Also, some paint films have failed and others are 60 per cent or more gone, according to *Paint Progress*, published by the New Jersey Zinc Co.

Copper Plating Process Offers Greater Stability

A high speed copper plating process which reduces operating costs and speeds production has been developed by Du-Pont Co., Wilmington, Del. Method makes possible further increases in current densities by substituting potassium cyanide and other potassium salts for sodium salts formerly used. Potassium cyanide is costlier, pound for pound, than sodium cyanide, but less is needed to maintain the plating bath at required strength. Dilute solutions of potassium salt are said to give equivalent to stronger concentrations in the old, and desired thickness of deposit now is acquired in shorter plating time. New bath also is more stable and easier to rinse.

The original method, introduced in 1938, plated heavier deposits of copper in a shorter time than had been possible before. It utilized a carefully compounded and controlled sodium copper cyanide bath, operating at 100 per cent current efficiency and at increased current densities.

Special Alloy Features High-Strength, Toughness

A new, high strength alloy, known as Burndy 113L, for cast, current-carrying parts of electrical connectors has been developed by Burndy Engineering Co. Inc., 107 Bruckner Blvd., New York 54. It is the same as the company's high copper alloy 113, with lithium added. Addition of lithium is said to provide a denser fine-grained casting, with tensile strength increased almost 20 per cent. Elongation also is increased about 20 per cent. Coefficient of friction is reduced, yet these advantages are said to be obtained with little change in electrical conductivity. Electrical connectors cast from this alloy are stronger and tougher, overcoming cracking in service, are more readily conformable to the conductor, and can be installed with greater applied pressure, according to the company.

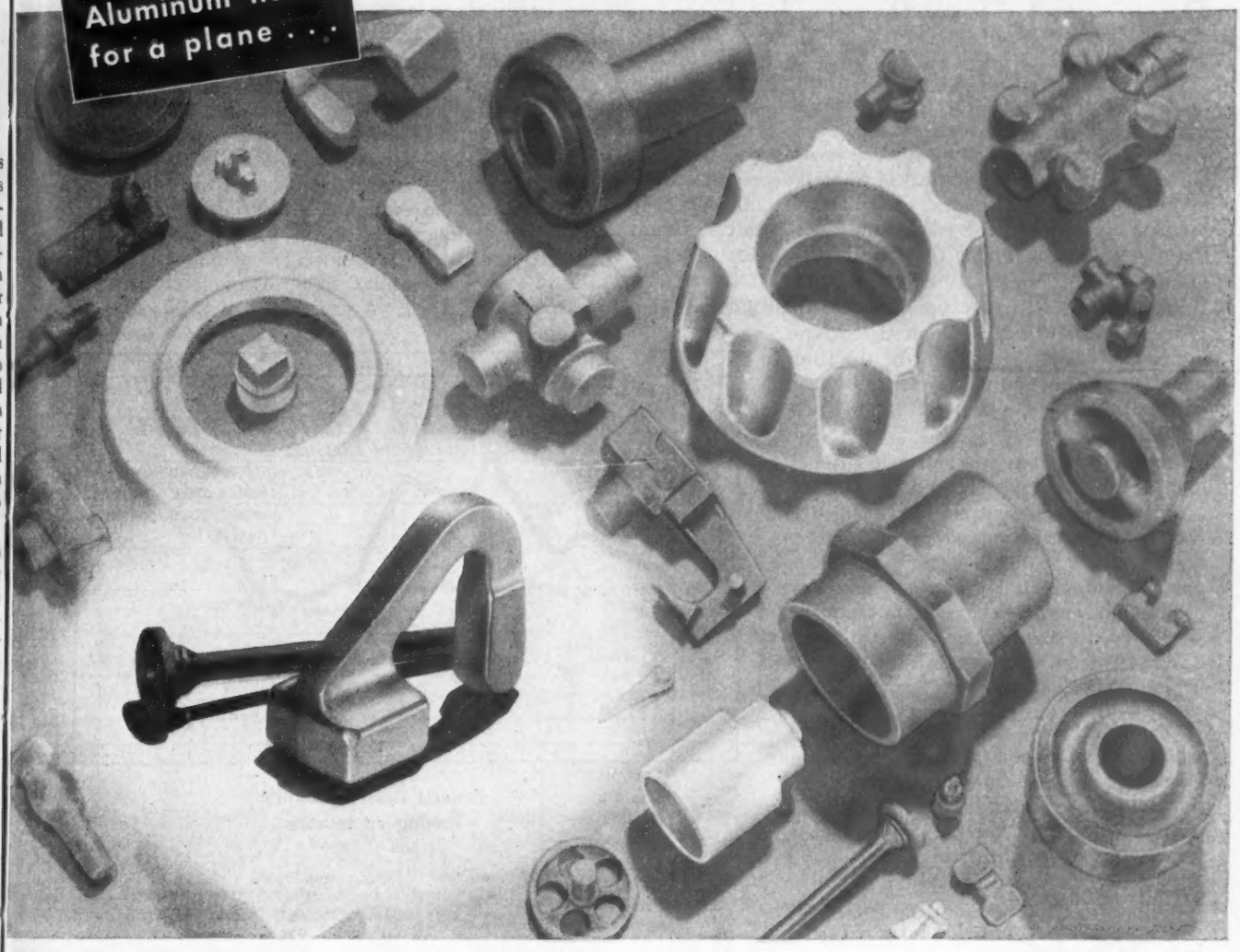
—o—

Steel spring vibration control equipment to increase useful life of large furnaces located adjacent to a battery of forging hammers in a drop forging plant has been developed by Korfund Co. Inc., Long Island City, N. Y. As furnaces are from 20 to 30 feet long, 8 to 10 feet wide, up to 10 feet high and weigh loaded from 150,000 to 200,000 pounds, heavy duty isolators are used.

Brass repair rivet for a valve . . . Aluminum "hook" for a plane . . .

SCOVILL FORGINGS

for close tolerances and extra strength



Repair rivets for valves must combine close tolerances with great strength. So Scovill extrudes them from brass slugs . . . a one-operation process to meet specified tolerances at low cost.

Structural components of aircraft frames must combine maximum strength with minimum weight. So Scovill, with typical versatility, makes the hook-shaped part of aluminum alloy . . . partly by hammer forging and partly by die pressing to maintain close tolerances.

Whenever you have a problem in metal parts production, follow the lead of more than 3,000 firms who have found that Scovill usually produces better metal parts at the same price or equally good at lower cost. Let Scovill apply to your forgings the ingenious designing and top-notch die-making that have earned for Scovill the title of "Masters of Metal".

Scovill's ability to produce for you the one *right* forging from the one *right* metal is proved in the free booklet, "Masters of Metal". Fill in the coupon below and mail it today.

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WATERBURY 91, CONN.

Please send me a free copy of *"Masters of Metal"* booklet describing your facilities. I am interested in the metal forgings applications checked.

☐ Valves, Torch Heads, Regulators, for compressed gas cylinders, Welding and Blow Torches, etc. ☐ Household Appliance Parts ☐ Plumbing Goods (valves, etc.) ☐ Industrial Instrument Parts ☐ Aircraft Parts ☐ Communications Equipment Parts ☐ General Electrical Product Parts ☐ Fire Extinguishers ☐ Cameras ☐ Oil Burners ☐ Band Instruments

Other applications.....

SCOVILL MANUFACTURING COMPANY
Forgings Division
20 Mill Street, Waterbury 91, Connecticut

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THE BUSINESS TREND

Optimism Prevails Over Prospects for Business

DESPITE the uncertainties in the business outlook, sentiment is optimistic for the future. Some heavy war contract cancellations have been made since V-E Day. However, cutbacks have not been as severe as had been expected. Consequently, industrial operations continue at a high level and indications are reconversion will have progressed sufficiently by the time war business slumps sharply to give assurance the gap from war to peacetime production will be relatively narrow in most cases.

Steel ingot production remained steady at 93½ per cent of capacity in the latest period, and no noticeable decline is in sight for the summer. Any reduction in war needs of steel will be offset by demand for civilian production.

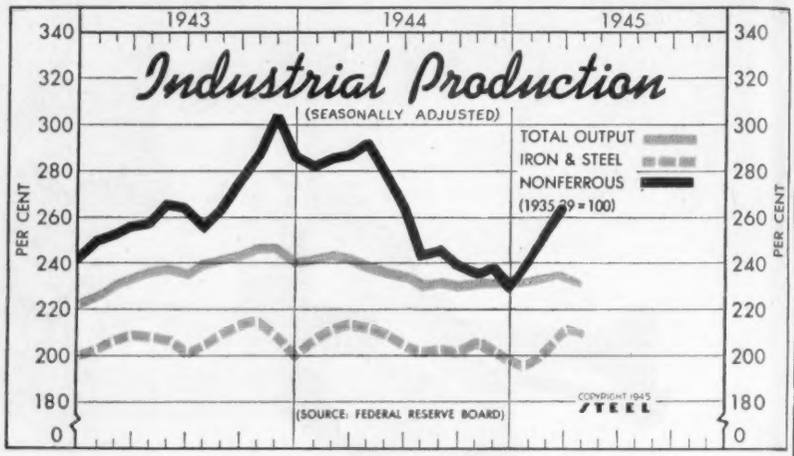
Bituminous coal production continued high in the latest weekly period. A daily average increase in output of 115,000 tons was reported. Estimated production for the week was 11,400,000 tons. The manpower shortage, however, has held coal production down all year. Thus far this year, production totals approximately 227,581,000 tons against 247,428,000 tons in the like period of 1944.

FRB's INDEX — Industrial production, which had advanced earlier this year, declined in April to the same general level that prevailed during the last half of 1944. Activity in the machinery and transportation equipment industries declined about 3 per cent in April, reflecting curtailed munitions production. Largest part of the decrease was accounted for by a further reduction in shipyard operations.

CONSTRUCTION — Civil engineering construction volume in continental United States totals $35,016,000 for the latest week. This volume is 21 per cent higher than in the preceding week, and 26 per cent above the total for the corresponding 1944 week.

STRUCTURAL STEEL—Bookings for fabricated structural steel for bridge and building construction have continued to show an encouraging gain. Figures for April are larger than for any month since July, 1942. The bookings totaled 94,452 tons in April, compared with 88,740 tons for the preceding month, and 61,498 tons reported for April, 1944. Reported shipments for bridge and building construction totaled 50,701 tons in April, compared with 44,495 tons for the same month in 1944.

LIVING COSTS—Living costs for the average family in the United States rose 0.4 per cent from March to April, according to the National Industrial Conference Board. The board's index was at the highest point for the war period, and the highest since December, 1925. Purchasing power of the dollar, in terms of goods in 1923, was 94.5 cents in April. A year ago it was 96 cents.



Federal Reserve Board's Production Indexes
(1935-39=100)

	Total Production			Iron, Steel			Nonferrous		
	1945	1944	1943	1945	1944	1943	1945	1944	1943
January	234	243	227	197	208	204	240	281	250
February	236	244	232	202	212	208	257	285	252
March	235	242	233	210	214	210	265	286	256
April	231	239	237	208	213	209	...	292	257
May	...	237	238	...	210	208	...	279	266
June	...	235	236	...	204	201	...	264	264
July	...	231	240	...	202	204	...	243	256
August	...	232	242	...	203	210	...	245	264
September	...	231	244	...	202	214	...	239	277
October	...	232	217	...	206	215	...	236	286
November	...	232	247	...	201	209	...	239	304
December	...	232	241	...	198	200	...	229	277
Average	...	236	239	...	206	208	...	260	267

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	93.5	93.5	94.0	98.5
Electric Power Distributed (million kilowatt hours)	4,300†	4,377	4,416	4,292
Bituminous Coal Production (daily av.—1000 tons)	1,900	1,785	1,830	2,002
Petroleum Production (daily av.—1000 bbls.)	4,875†	4,867	4,805	4,514
Construction Volume (ENR—unit $1,000,000)	$35.0	$29.0	$32.3	$27.9
Automobile and Truck Output (Ward's—number units)	21,010	21,260	20,045	18,260

*Dates on request.

TRADE				
Freight Carloadings (unit—1000 cars)	873†	869	899	870
Business Failures (Dun & Bradstreet, number)	15†	15	24	33
Money in Circulation (in millions of dollars)‡	$26,399	$26,372	$26,074	$21,911
Department Store Sales (change from like week a year ago)†	−1%	+5%	+3%	+31%

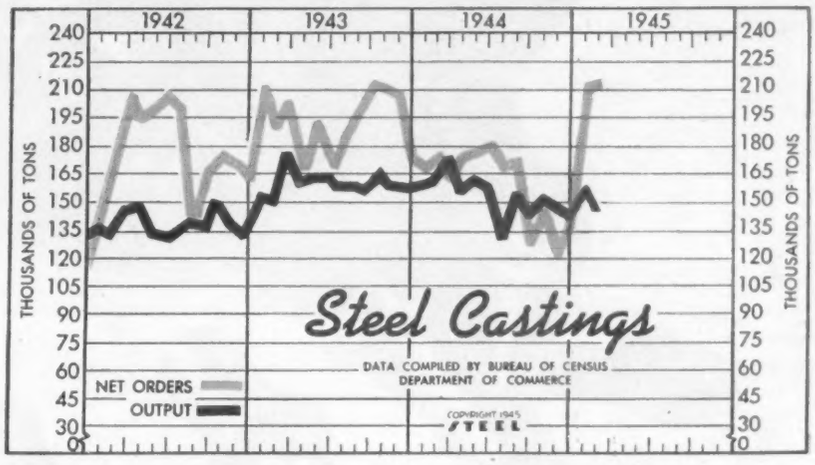
†Preliminary. ‡Federal Reserve Board.

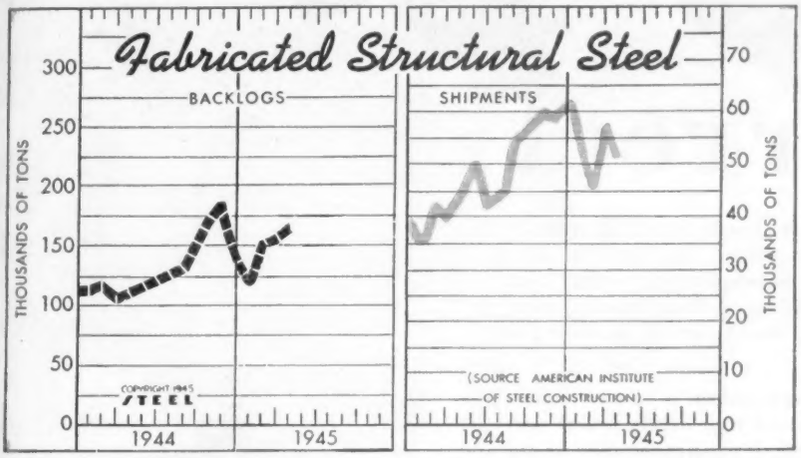
Commercial Steel Castings†

(Net tons in thousands)

	Orders		Production	
	1945	1944	1945	1944
Jan.	210.2	167.7	157.2	159.8
Feb.	214.4	173.6	146.2	161.4
Mar.	....	162.6	....	174.6
Apr.	....	175.1	....	155.8
May	....	177.0	....	161.8
June	....	181.8	....	157.4
July	....	169.9	....	131.9
Aug.	....	171.3	....	154.9
Sept.	....	129.8	....	144.5
Oct.	....	146.1	....	150.7
Nov.	....	120.7	....	146.4
Dec.	....	138.7	....	144.2
Total	....	159.5	....	153.6

†For sale.





Fabricated Structural Steel

(1000 tons)

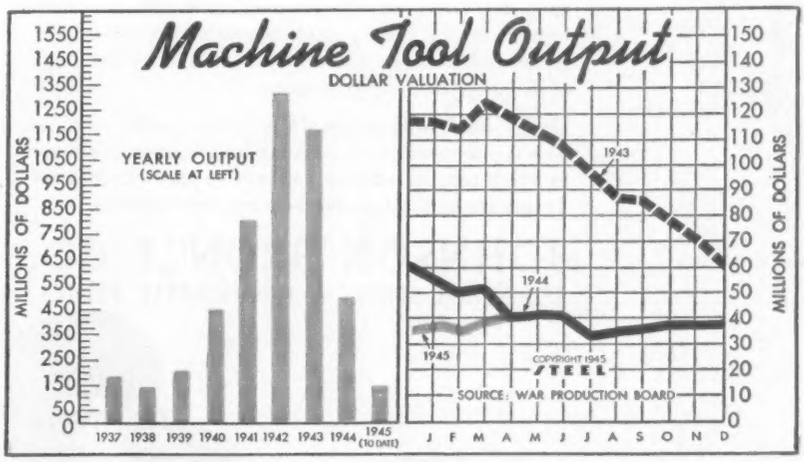
	Shipments			Backlogs		
	1945	1944	1943	1945	1944	1943
Jan.	54.5	35.2	91.9	124.4	113.1	339.1
Feb.	47.4	42.9	90.8	151.6	117.6	321.0
Mar.	57.6	41.4	94.0	153.3	106.3	299.8
Apr.	50.7	44.5	86.6	162.5	111.2	272.5
May	...	50.7	78.9	....	116.3	220.6
June	...	43.0	68.4	....	122.7	207.1
July	...	45.3	56.8	....	125.4	201.8
Aug.	...	55.2	50.2	....	130.4	195.6
Sept.	...	57.5	51.8	....	151.1	208.1
Oct.	...	61.6	80.1	....	174.4	274.0
Nov.	...	59.4	42.7	....	184.2	134.6
Dec.	...	61.3	39.6	....	142.5	113.0

Source: American Institute of Steel Construction. Figures represent members' reports only.

Machine Tool Output

(000 omitted)

	1945	1944	1943	1942
Jan.	$37,498	$56,363	$117,384	$83,547
Feb.	36,018	50,127	114,594	84,432
Mar.	39,374	51,907	125,445	98,358
Apr.	40,331	41,370	118,024	103,364
May	.....	41,819	113,859	107,297
June	.....	41,471	108,736	111,090
July	.....	32,753	97,428	113,596
Aug.	.....	35,177	87,405	117,342
Sept.	.....	35,876	85,842	119,883
Oct.	.....	37,516	78,300	130,008
Nov.	.....	36,277	71,811	120,871
Dec.	.....	36,782	60,861	131,960
Year				
1944	.....			497,438
1943	.....			1,179,689
1942	.....			1,321,862
1941	.....			812,462
1940	.....			450,000



FINANCE

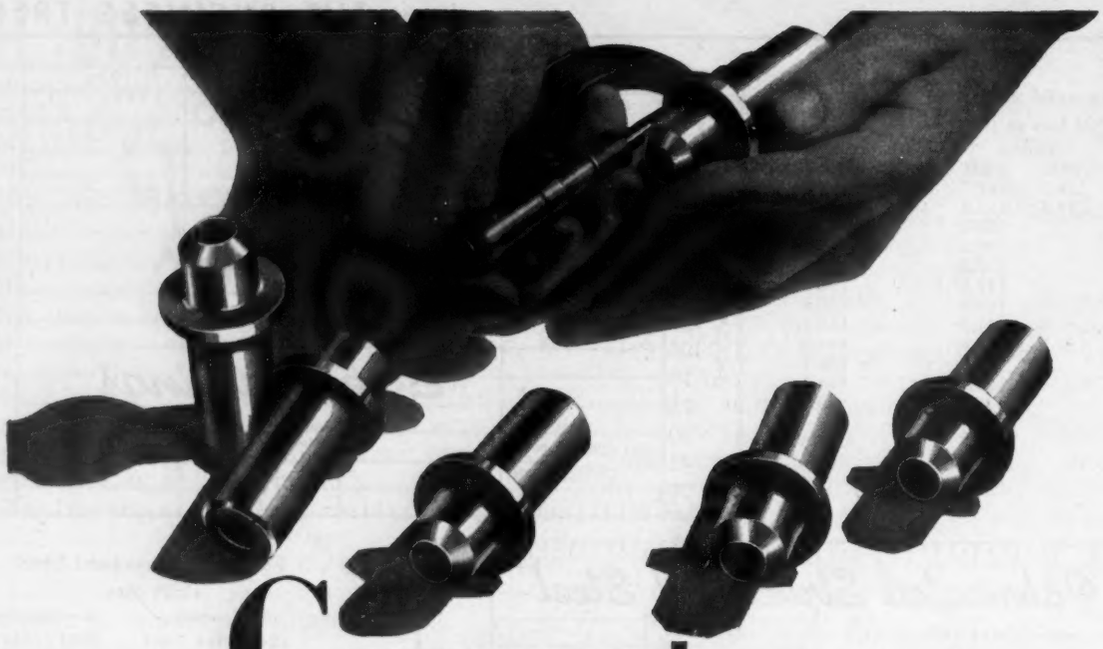
	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—thousands)	$11,099	$11,025	$10,106	$8,666
Federal Gross Debt (billions)	$238.2	$237.3	$235.7	$187.7
Bond Volume, NYSE (millions)	$43.6	$52.2	$81.4	$59.7
Stocks Sales, NYSE (thousands)	6,407	6,724	8,280	4,611
Loans and Investments (billions)†	$57.2	$57.0	$57.3	$50.3
United States Gov't Obligations Held (millions)†	$42,853	$42,748	$43,143	$37,232

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$58.27	$57.55	$57.55	$56.73
All Commodities†	105.8	105.7	105.6	103.8
Industrial Raw Materials†	117.9	117.9	117.7	113.3
Manufactured Products†	102.1	102.0	101.9	101.1

†Bureau of Labor's Index, 1926 = 100.



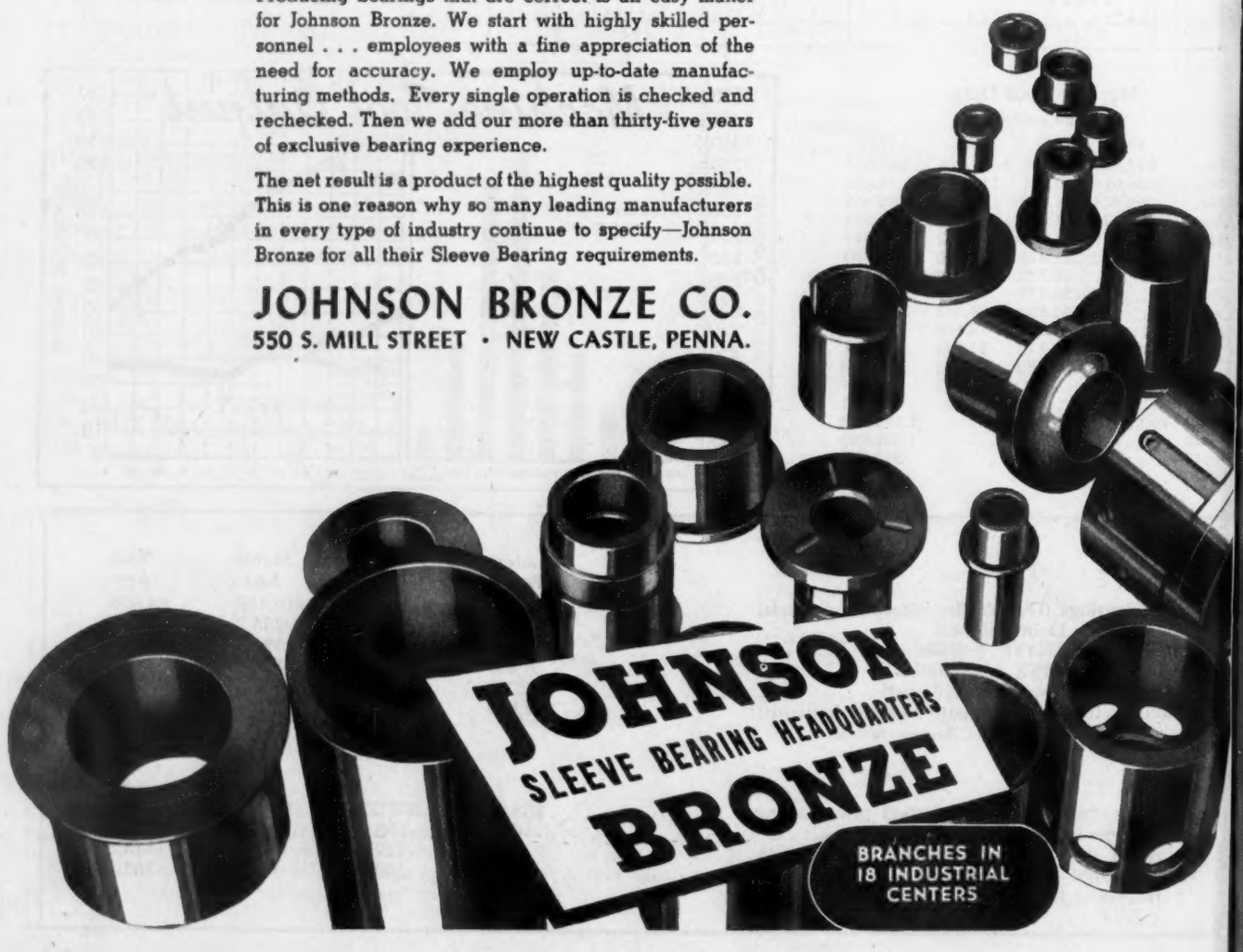
Correct

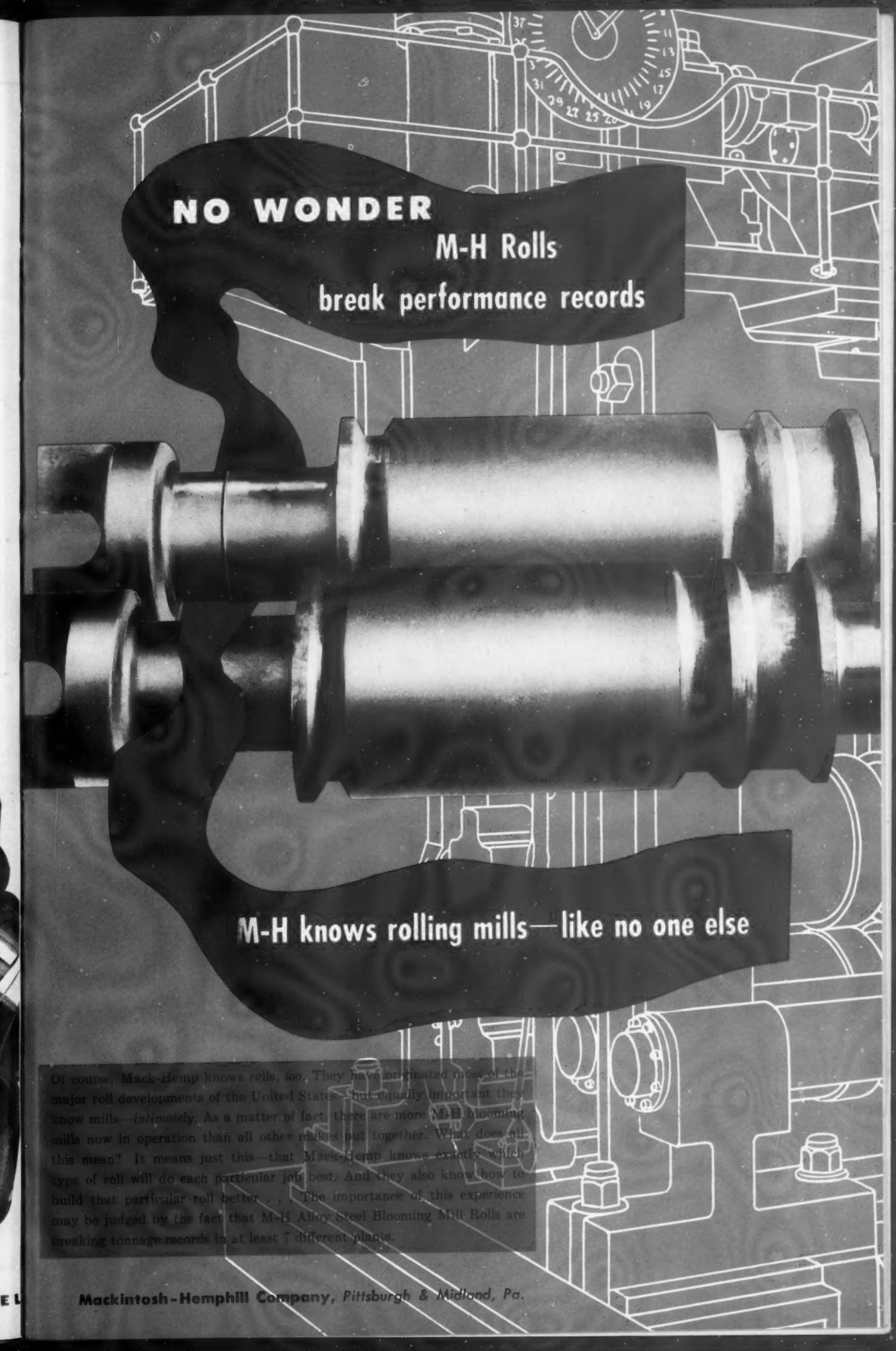
Sleeve Bearings cannot be "nearly right." In order to function properly . . . to deliver the utmost in performance for the longest period of time . . . they must be *correct* in every single detail. Every measurement must be precise. The alloy must be strictly according to specifications.

Producing bearings that are correct is an easy matter for Johnson Bronze. We start with highly skilled personnel . . . employees with a fine appreciation of the need for accuracy. We employ up-to-date manufacturing methods. Every single operation is checked and rechecked. Then we add our more than thirty-five years of exclusive bearing experience.

The net result is a product of the highest quality possible. This is one reason why so many leading manufacturers in every type of industry continue to specify—Johnson Bronze for all their Sleeve Bearing requirements.

JOHNSON BRONZE CO.
550 S. MILL STREET · NEW CASTLE, PENNA.




NO WONDER
M-H Rolls
break performance records
M-H knows rolling mills—like no one else
Of course, Mack-Hemp knows rolls, too. They have originated most of the major roll developments of the United States—but equally important they know mills—*intimately*. As a matter of fact, there are more M-H blooming mills now in operation than all other makes put together. What does all this mean? It means just this—that Mack-Hemp knows exactly which type of roll will do each particular job best. And they also know how to build that particular roll better . . . The importance of this experience may be judged by the fact that M-H Alloy Steel Blooming Mill Rolls are breaking tonnage records in at least 7 different plants.
Mackintosh-Hemphill Company, *Pittsburgh & Midland, Pa.*

Perfection in a Bronze Bearing consists of precision, fine finish, uniform metallurgical and physical properties. Bunting Bronze Bearings today are more perfect than any ever before produced in volume. The Bunting Brass & Bronze Company, Toledo 9, Ohio. Warehouses in principal cities.

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BRONZE BEARINGS ☆ BUSHINGS ☆ PRECISION BRONZE BARS

18

Civilian Steel Prospects For Third Quarter Meager

War cancellations have little effect on nearby deliveries . . . Export and lend-lease press for large tonnages . . . Pig iron output slows

PROSPECTS for rolling of much unrated steel during third quarter are not bright, except possibly in plates.

There is a possibility the situation may change in the next few weeks, but is not regarded as probable. Recent cancellations, mainly in Army aircraft, have not been appreciably reflected in steel schedules and effect of military curtailments in the past month has not been as pronounced as had been expected. Influence of cutbacks may become more pronounced by the end of June as Washington is able to appraise needs in the Pacific and estimate how much equipment can be shifted from Europe. Decline in steel backlogs as a result of cutbacks has been moderate and has had relatively little effect on nearby deliveries. Where gaps have appeared they have been filled promptly by other war work or essential civilian requirements.

Under this situation it would not appear there will be any drastic cut in steel output in third quarter, especially in view of the heavy unrated tonnage now pressing for scheduling. However, there may be noticeable decline in steel demand, in view of the many problems of changing to civilian production. Among drawbacks to heavy steel consumption in the transition are difficulties of proper timing of various materials and parts required in manufacturing assemblies or building projects.

Pricing is an important element, as many small manufacturers claim they will not be able to market their normal civilian products at a profit under present high costs and lack resources to carry them until price restrictions may be raised.

Requirements for rehabilitation in Europe are beginning to shape up. At least 20,000 tons of plates have just been distributed under lend-lease for France and 14,000 tons of shapes have been placed with one mill. How much of this type of order will be placed under lend-lease in the next few months is not certain. Third quarter allocations for the Foreign Economic Administration are expected to be slightly heavier than in second quarter, probably averaging about 100,000 tons per month, the larger part going to South American countries and the Near East. Lend-lease requirements are uncertain and unless the recently canceled Russian tonnage is reinstated lend-lease shipments probably will be lighter, in spite of rehabilitation requirements now coming out, particularly for France. On the other hand, should Russia enter the war against Japan movement of lend-lease would be resumed, an important factor in the entire situation.

Steelworks operations last week declined 2 points to 91½ per cent of capacity, because of slight losses in seven of the 12 districts. Buffalo was the only area showing a gain, rising 7 points to 90½ per cent on recovery from a strike interruption. Pittsburgh dropped 1½ points to 90½ per cent, Chicago 1½ points to 97, Wheeling 3 points to 89½, Detroit 5 points to 83, New England 2 points to 90, Youngstown 9 points to 80 and Cleveland 3 points to 91. Rates were unchanged as follows: Cincinnati 84, eastern Pennsylvania 92, Birmingham 90 and St. Louis 75.

Pig iron production in April totaled 4,785,659 net tons, compared with 5,227,790 tons in March and 5,243,410 tons in April, 1944. Cumulative tonnage for four months this year was 19,521,211 tons, against 21,082,127 tons in the comparable period in 1944. Capacity engaged in April was 86.4 per cent, compared with 91.4 in March.

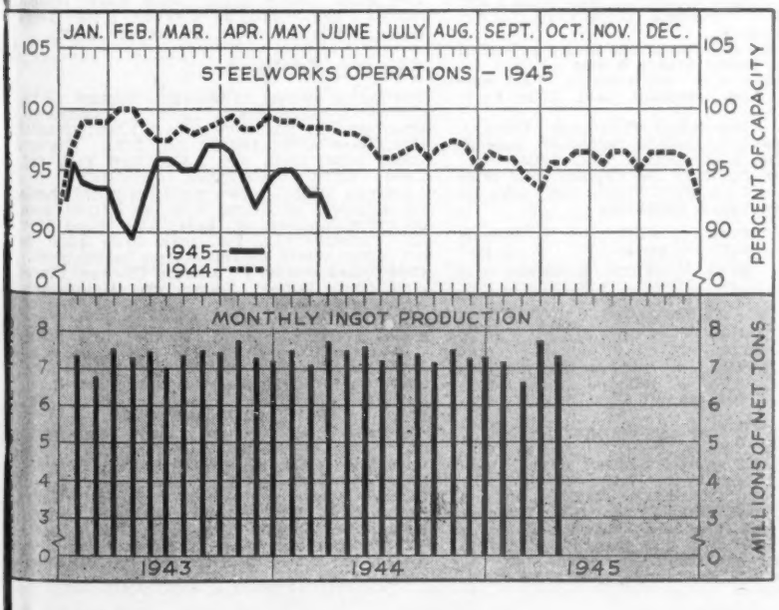
Average composite prices of steel and iron products are steady at Office of Price Administration ceilings except for steelmaking scrap, which is slightly below because of weakness in the East. Finished steel composite is $58.27, semifinished steel $37.80 and steelmaking pig iron $24.05. Steelmaking scrap composite is $19.00.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended June 2	Change	Same Week 1944	Same Week 1943
Pittsburgh	90.5	—1.5	93	98.5
Chicago	97	—1.5	101.5	97
Eastern Pa.	92	None	94	95
Youngstown	80	—9	96	97
Wheeling	89.5	—3	101	94
Cleveland	91	—3	91.5	95.5
Buffalo	90.5	+7	90.5	90.5
Birmingham	90	None	95	100
New England	90	—2	90	95
Cincinnati	84	None	87	94
St. Louis	75	None	74.5	91.5
Detroit	83	—5	89	80
Estimated national rate	91.5	—2	*98.5	*98.5

*Based on steelmaking capacities as of these dates.



COMPOSITE MARKET AVERAGES

	June 2	May 26	May 19	One Month Ago May, 1945	Three Months Ago Mar., 1945	One Year Ago June, 1944	Five Years Ago June, 1940
Finished Steeel	$58.27	$58.27	$57.55	$57.73	$57.55	$56.73	$56.73
Semifinished Steel	37.80	37.80	36.00	36.45	36.00	36.00	36.00
Steelmaking Pig Iron	24.05	24.05	24.05	24.05	23.55	23.05	22.05
Steelmaking Scrap	19.00	19.00	19.17	19.13	19.17	19.17	19.15

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	June 2, 1945	May, 1945	Mar., 1945	June, 1944
Steel bars, Pittsburgh	2.25c	2.17c	2.15c	2.15c
Steel bars, Chicago	2.25	2.17	2.15	2.15
Steel bars, Philadelphia	2.57	2.49	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.25	2.22	2.20	2.10
Plates, Philadelphia	2.30	2.26	2.25	2.15
Plates, Chicago	2.25	2.22	2.20	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.65	3.65	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.65	3.65	3.50
Bright bess., basic wire, Pittsburgh	2.75	2.64	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.90	2.82	2.80	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$36.00	$34.50	$34.00	$34.00
Slabs, Pittsburgh, Chicago	36.00	34.50	34.00	34.00
Rerolling billets, Pittsburgh	36.00	34.50	34.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts	2.15	2.05	2.00	2.00

Pig Iron

	June 2, 1945	May, 1945	Mar., 1945	June, 1944
Bessemer, del. Pittsburgh	$26.19	$26.19	$26.19	$25.19
Basic, Valley	24.50	24.50	24.50	23.50
Basic, eastern del. Philadelphia	26.34	26.34	26.34	25.34
No. 2 fdry., del. Pitts., N.&S. Sides	25.69	25.69	25.69	24.69
No. 2 foundry, Chicago	25.00	25.00	25.00	24.00
Southern No. 2, Birmingham	21.38	21.38	21.38	20.38
Southern No. 2 del. Cincinnati	25.30	25.30	25.30	24.30
No. 2 fdry., del. Phila.	26.34	26.34	26.34	25.84
Malleable, Valley	25.00	25.00	25.00	24.00
Malleable, Chicago	25.00	25.00	25.00	24.00
Lake Sup., charcoal, del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.19	25.19	25.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33	140.33

Scrap

Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.56	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke

Connellsville, furnace, ovens	$7.50	$7.00	$7.00	$7.00
Connellsville, foundry ovens	8.25	7.75	7.75	7.75
Chicago, by-product fdry., del.	13.35	13.35	13.35	13.35

STEEL, IRON RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and May 21, 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.

(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill Kaiser Co. Inc., $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop., $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bil) $38; Pac. Ports, (bil) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $38.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42. Detroit, del. $44; Duluth, billets, $44; forg. bil. f.o.b. Pac. ports, $54.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles).

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54; del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—$\frac{9}{32}$ in. inclusive, per 100 lbs., $2.15. Do., over $\frac{9}{32}$—$\frac{47}{64}$-in., incl., $2.30; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific ports $0.50. (Pittsburgh Steel Co., $0.20 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3": Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Mahoning Valley 2.32½c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c. (Calumet Steel Division, Borg Warner Corp., and Joslyn Mfg. & Supply Co. may quote 2.35c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.35c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.80c.

(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.70
		(.20-.30 Mo)	0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70c; Toledo 2.80c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City. New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.35c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00c, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.

(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.70c; Granite City, base 3.80c; New York del. 3.94c; Phila. del 3.87c; Pacific ports 4.25c.

(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.36c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 2.85c; Granite City, base 2.95c; Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; **20-gage;** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrical	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	.....
65	7.25c	8.00c	.....
58	7.75c	8.50c	.....
52	8.55c	9.30c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, $4.50; 0.75 lb. tin 4.65.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 1 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c.

Phoenix Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export; Sheffield Steel Corp., 2.35c f.o.b. St. Louis. Geneva Steel Co., 3.25c, Pac. ports); Kaiser Co. Inc., 3.20c f.o.b. Los Angeles).

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth).

Bright basic, bessemer wire 2.75c
Spring wire 3.20c
(Pittsburgh Steel Co., 0.20c higher.)

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.90; galvanized, $2.55; Pacific ports .....$3.40 and $3.05

Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.20c

Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.55c

Woven fence, 15½ gage and heavier, per rod ..... .67c

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted 2-point wire, column 70.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	¼	24	3½
¼ & ⅜	59	40½	⅜	30	10
½	63½	51	½-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-19	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2½"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.60
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35 20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet). Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates, $46 net ton, base. Standard spikes, 3.25c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung.	Chr.	Van.	Moly.	Pitts. base per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
....	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27 00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices, wasters 75%, waste-wasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller ..... 65½ off
Do., ⅝ and ⅝ x 6-in. and shorter... 63½ off
Do., ¾ to 1 x 6-in. and shorter ..... 61 off
1⅛ and larger, all lengths ..... 59 off
All diameters, over 6-in. long ..... 59 off
Tire bolts ..... 50 off
Step bolts ..... 56 off
Plow bolts ..... 65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex	U.S.S.	S.A.E.
7/16-inch and less	62	64
½-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	

Hexagon Cap Screws

Upset 1-in., smaller ..... 64 off
Milled 1-in., smaller ..... 60 off

Square Head Set Screws

Upset, 1-in., smaller ..... 71 off
Headless, ¼-in., larger ..... 60 off
No. 10, smaller ..... 70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural 3 75c
7/16-inch and under ..... 65-5 off
Wrought Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.....$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75
By-Product Foundry	
Kearney, N. J., ovens	12.65
Chicago, outside delivered	12.60
Chicago, delivered	13.35
Terre Haute, delivered	13.10
Milwaukee, ovens	13.35
New England, delivered	14.25
St. Louis, delivered	†13.35
Birmingham, delivered	10.50
Indianapolis, delivered	13.10
Cincinnati, delivered	12.35
Cleveland, delivered	12.80
Buffalo, delivered	13.00
Detroit, delivered	13.35
Philadelphia, delivered	12.83

*Operators of hand-drawn ovens using trucked coal may charge $8.00, effective May 26, 1945.
†13.85 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do., tank cars	11.00c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	3.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$30.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.144[11]	4.715	6.012[23]	6.012[23]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.103[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.103[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[13]	4.872[25]	4.072[21]	4.772	5.816[25]	5.860[25]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.052[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[20]	4.041[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.165[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[10]	3.75[21]	4.669	5.60[23]	5.75[23]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[15]	4.30[10]	3.65[21]	4.35	5.60[23]	5.75[23]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.40[24]	3.75[21]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.30[24]	3.65[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[13]	4.40[24]	3.75[21]	4.45[21]	5.60[23]	5.65[23]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.65[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[12]	4.500[24]	3.800[21]	4.659	5.93[23]	5.93[23]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[19]	5.443[24]	4.443[12]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[19]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	6.391[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[12]	4.475[24]	4.011[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[16]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.75[21]	4.65	5.75[23]	5.85[23]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[24]	3.887[21]	4.787	5.987[23]	6.087[23]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	3.98[21]	4.78	6.08[23]	6.18[23]
St. Paul	3.76[3]	3.81[3]	3.81[3]	5.41[3]	3.51[3]	3.86[3]	3.86[3]	5.257[15]	4.46[24]	4.361[21]	5.102	6.09[23]	6.19[23]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[1]	5.172[15]	4.347[24]	4.031[21]	4.931	6.131[23]	6.231[23]
Memphis, Tenn.	4.015[5]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[15]	4.78[24]	4.33[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.903[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.852[24]	4.54	5.215	.....	.....
New Orleans (city)	4.10[6]	3.90[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[26]	5.079[10]	4.60[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[9]	3.763[3]	4.313[3]	4.313[3]	5.313[26]	4.10[10]	3.65[22]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6.00[12]	7.20[6]	5.583[22]	5.613	5.85[23]	5.95[23]
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[15]	7.30[15]	5.333[21]	7.333	8.304[23]	8.404[23]
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.30[27]	5.75[15]	6.60[15]	5.533[15]	.....	.....	.....
Tacoma	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.60[15]	5.783[21]	.....	.....	8.00[23]
Seattle	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.05[15]	5.783[21]	.....	.....	8.00[23]

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 18 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton. 51½% (Natural) Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	18.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50

Domestic (seller's nearest rail)

48% 3:1	52.80

less $7 freight allowance

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.00
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.80	36.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.00	$25.50	$27.00	$26.50
Newark, N. J., del.	27.53	27.03	28.53	28.03
Brooklyn, N. Y., del.	28.50	.....	.....	29.00
Birdsboro, Pa., base	26.00	25.50	27.00	26.50
Birmingham, base	†21.38	†20.00	26.00	.....
Baltimore, del.	26.61	.....	.....	.....
Boston, del.	26.12	.....	.....	.....
Chicago, del.	25.22	.....	.....	.....
Cincinnati, del.	25.06	23.68	.....	.....
Cleveland, del.	25.12	24.24	.....	.....
Newark, N. J., del.	27.15	.....	.....	.....
Philadelphia, del.	26.46	25.96	.....	.....
St. Louis, del.	25.12	24.24	.....	.....
Buffalo, base	25.00	24.00	26.00	25.50
Boston, del.	26.50	26.00	27.50	27.00
Rochester, del.	26.53	.....	27.53	27.03
Syracuse, del.	27.08	.....	28.08	27.58
Chicago, base	25.00	24.50	25.50	25.00
Milwaukee, del.	26.10	25.60	26.60	26.10
Muskegon, Mich., del.	28.19	.....	.....	28.19
Cleveland, base	25.00	24.50	25.50	25.00
Akron, Canton, O., del.	26.39	25.89	26.89	26.39
Detroit, base	25.00	24.50	25.50	25.00
Saginaw, Mich., del.	27.31	26.81	27.81	27.31
Duluth, base	25.50	25.00	26.00	25.50
St. Paul, del.	27.63	27.13	28.13	27.63
Erie, Pa., base	25.00	24.50	26.00	25.50
Everett, Mass., base	26.00	25.50	27.00	26.50
Boston, del.	26.50	26.00	27.50	27.00
Granite City, Ill., base	25.00	24.50	25.50	25.00
St. Louis, del.	25.50	25.00	.....	25.50
Hamilton, O., base	25.00	24.50	.....	25.00
Cincinnati, del.	25.44	25.61	.....	26.11
Neville Island, Pa., base	25.00	24.50	25.50	25.00
§Pittsburgh, del. No. & So. sides	25.69	25.19	26.19	25.69
Provo, Utah, base	23.00	22.50	.....	.....
Sharpsville, Pa., base	25.00	24.50	25.50	25.00
Sparrows Point, base	26.00	25.50	.....	.....
Baltimore, del.	26.99	.....	.....	.....
Steelton, Pa., base	.....	25.50	.....	26.50
Swedeland, Pa., base	26.00	25.50	27.00	26.50
Philadelphia, del.	26.84	26.34	.....	27.34
Toledo, O., base	25.00	24.50	25.50	25.00
Youngstown, O., base	25.00	24.50	25.50	25.00
Mansfield, O., del.	26.94	26.44	27.44	26.94

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. †For phosphorus 0.70% or over deduct 38 cents. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base).....$30.50

6.51-7.00	$31.50	9.01- 9.50	36.50
7.01-7.50	32.50	9.51-10.00	37.50
7.51-8.00	33.50	10.01-10.50	38.50
8.01-8.50	34.50	10.51-11.00	39.50
8.51-9.00	35.50	11.01-11.50	40.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.00% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Island, Pa. $24.50
Valley base 24.50

Low Phosphorus

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $66.55

First Quality

Pa., Ill., Md., Mo., Ky.	52.85
Alabama, Georgia	52.85
New Jersey	57.70
Ohio	46.35

Second Quality

Pa., Ill., Md., Mo., Ky.	47.90
Alabama, Georgia	39.15
New Jersey	50.50
Ohio	37.10

Malleable Bung Brick

All bases 61.65

Silica Brick

Pennsylvania	52.65
Joliet, E. Chicago	60.65
Birmingham, Ala.	52.85

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	31.95
Wire cut	29.90

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk 22.00
net ton, bags 26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick $54.00

Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net ton, carloads CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. (After Aug. 29 base price any grade $30.) war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, eastern, central and western zones, $135; add $6 for packed c.l., $10 for ton, $13.50 less-ton; f.o.b. cars, Eastern seaboard and Gulf ports, $1.70 for each 1%, or fraction contained manganese over 82% or under 78%; delivered Pittsburgh, $140.33.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central, 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R.R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome: Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65c for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom. 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium; 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed; 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58. 50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western, spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max., sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract, ton lots, $1.89, less, $2.01, eastern, freight allowed; $1.903 and $2.023 central, $1.935 and $2.055 western, spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot, up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake: Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed, per pound vanadium oxide contained; contract cariots, $1.105, less cariots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract, ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 Central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, cariots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, cariot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, cariots, bulk .0605c, packed .063c, tons .0655c, less .068c, eastern, freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c, 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 to c.l., 35c; central 34.25c and 36c; western, 34.55c and 38.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Spot, carlots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder: spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50, 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80, highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads bulk per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Simanal: (Approx. 20% each Si, Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 150 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.25
No. 2 Heavy Melt. Steel	18.25
No. 2 Bundles	15.75-16.25
No. 3 Bundles	13.75-14.25
Mixed Borings, Turnings	9.50
Machine Shop Turnings	9.50
No. 2 Busheling	12.50
Billet, Forge Crops	20.75-21.25
Bar Crops, Plate Scrap	20.75-21.25
Cast Steel	20.75-21.25
Punchings	20.75-21.25
Elec. Furnace Bundles	18.75
Heavy Turnings	17.00

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$14.33-15.33
No. 2 Heavy Melt. Steel	14.33-15.33
No. 2 Hyd. Bundles	12.83-15.33
No. 3 Hyd. Bundles	10.83
Chemical Borings	14.33
Machine Turning	6.50
Mixed Borings, Turnings	6.50
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	10.00-10.50
Short Shovel Turnings	14.00-14.50
Mixed Borings, Turnings	12.00-12.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.00-13.50
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	13.06-14.06
No. 1 Busheling	13.06-14.06
Machine Shop Turnings	5.50
Mixed Borings, Turnings	5.50
Short Shovel, Turnings	7.50
Chemical Borings	13.06
Low Phos. Clippings	16.56
No. 1 Cast	20.06
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel, Turnings	16.00
Mach. Shop Turnings	14.00
Mixed Borings, Turnings	14.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	21.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$21.00
No. 1 Heavy Melt Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	15.00-15.50
Cast Iron Borings	14.00-14.50
Machine Shop Turnings	11.50-12.50
Low Phos. Plate	21.00-22.00

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	11.00-11.50

BIRMINGHAM:

(Delivered consumer's plant)

Billet, Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails, Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	16.25-18.50
No. 3 Galv. Bundles	14.25-14.75
Machine Turnings	10.50-12.00
Mix. Borings, Sht. Turn.	12.00-12.50
Short Shovel Turnings	12.00-12.50
Cast Iron Borings	12.00-12.50
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00
(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)	

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	12.00
Short Shovel Turnings	14.00
Mixed Borings, Turn.	12.00
Cast Iron Borings	13.00
Low Phos.	21.75

DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	7.00- 7.50
Short Shovel. Turnings	10.50-11.00
Cast Iron Borings	9.50-10.00
Low Phos Plate	19.32-19.82
No. 1 Cast	20.00
Heavy Breakable Cast	13.50-14.00

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	$17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	6.50- 7.00
Rerolling Rails	21.00
Steel Car Axles	21.50-22.00
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25
(Cast grades f.o.b. shipping point)	
Stove Plate	18.00

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	7.50- 8.00
Shoveling Turnings	9.50-10.00
Cast Iron Borings	9.50-10.00
Mixed Borings, Turnings	8.50- 9.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Deal. Bundles	12.00
Machine Turnings	4.50
Mixed Borings, Turnings	4.00
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.50
No. 3 Bundles	9.00
Machine Turnings	6.50
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut Structural, Plate, 1", under	18.00
Alloy-free Turnings	7.50
Tin Can Bundles	14.50
No. 2 Steel Wheels	16.00
Iron, Steel Axles	23.00
No. 2 Cast Steel	15.00
Uncut Frogs, Switches	16.00
Scrap Rails	16.00
Locomotive Tires	16.00

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.40c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low-grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.), 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Prices for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239. 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American, bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224-lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: OPA ceiling prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz., $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193. Open market, spot, New York, nominal for 50 to 100 flasks; $158 to $163 in smaller quantities.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.46c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2% 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more, plant scrap only. Segregated solids: S-type alloys (2S, 3S, 17S, 18S, 24S, 32S, 52S) 9.00c, 10.00c, 10.50c; All other high grade alloys 8.50c, 9.50c, 10.00c; low grade alloys 8.00c, 9.00c, 9.50c. Segregated borings and turnings: Wrought alloys (17S, 18S, 32S, 52S) 7.50c, 8.50c, 9.00c; all other high grade alloys 7.00c, 8.00c, 8.50c; low grade alloys 6.50c, 7.50c, 8.00c. Mixed plant scrap, all solids, 7.50c, 8.50c, 9.00c; borings and turnings 5.50c, 6.50c, 7.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 186

Sheet demand shows no slackening and deliveries are being deferred further. Most interest is in prompt material and as little space is available buying is limited. Civilian demand is increasing but little assurance of firm delivery dates is possible. Hot-rolled pickled and cold-rolled deliveries in most cases are about the end of the year or early 1946. Validated orders carry well through third quarter but automotive and other consumers are seeking July 1 promises.

Boston — Heavier unrated orders on which deliveries are uncertain are in excess of cancelled and cutback tonnage affecting nearby schedules. Backlogs of CMP tonnage for forward delivery are too large to enable most mills to make firm commitments on unrated volume for third quarter and limits fourth quarter openings on the basis of current cancellations. Extensions in deliveries have been halted in numerous cases and in spots have improved by a month or more. Scattered hot-rolled electro-galvanized and galvanized are in this category, also stainless promised in spots for July and August. Cutbacks involve cancellations in cold-rolled sheets and strip for powder containers. In connection with placing of unrated orders pressure from the automobile industry for definite promises as to production space and delivery is outstanding, but cancellations of firm orders now in backlog will have to be heavier before substantial openings will occur. More delayed cancellations are expected to develop this month. However, new volume of rated tonnage is lower.

Philadelphia — Most interest in sheets is for nearby shipment and as there is little capacity available, buying therefore is somewhat limited. However as automotive requirements take shape a livelier interest in future positions is expected. Meanwhile, hot-rolled pickled and cold-rolled sheet deliveries are holding generally around late December to February of 1946. One leading producer jumped his deliveries on cold-reduced sheets from November to February within the past week. This is believed to have been due primarily to a shift of tonnage to tin mills. Galvanized still can be had in November, although some sellers are booked well into first half as also are some producers of hot narrow strip. Stainless steel sheet delivery falls mainly in September but may experience another easing soon as a result of the further recent cutback in Army aircraft production.

Pittsburgh — Civilian demand continues to rise. An avalanche of tonnage has poured onto producers, who are caught between government releases of civilian goods restrictions and full order books. Nowhere in the steel picture is the situation so bad as in sheets. Most producers are loaded with validated orders carrying through third quarter and beyond, while all sheet buyers from automobile builders on down are clamoring for July 1 tonnage. The answer is not yet in sight. Much sheet tonnage has been booked in the hope that there may be cancellations. Some of this tonnage carries definite promises, other lots only accepted for delivery when possible.

St. Louis — Sheet production in this area received its first cutback in products in actual manufacture when about 400 tons for bomb components were canceled. It represented approximately 4 per cent of a month's production and four civilian customers placed bids for it within 24 hours. Some backlogged orders continue to be canceled, but are replaced by others. The labor shortage continues and two furnaces are shut down as a result. Hot-rolled sheet deliveries are extended to December, cold-rolled to January and galvanized to August. All production remains on CMP but directives mainly involve galvanized sheets.

New York — Sheet buying is spotty with backlogs shrinking slightly. Most mills are quoting hot and cold-rolled sheets for delivery late this year and early in 1946. Silicon sheet deliveries range from November through March, next year, depending mainly on silicon content. A little stainless steel is being offered for August, with most mills quoting September.

Cleveland — Cancellations are increasing but additional orders come close to balancing losses. Schedules are tight and little third quarter business can be taken. On most sheet grades deliveries are well toward the end of the year and even into next.

Chicago — Demand for sheets continues to exceed supply and urgent military needs can be inserted in schedules only by directives. Sheetmakers' books are filled through third quarter by CMP orders. Virtually all mills have received numerous inquiries for sheets

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for the Navy's 25 per cent increase in the 1945 pontoon program, but are unable to meet required deliveries in what otherwise would be desirable tonnage. In its pontoon program, the Navy now is permitting contractors to find their own steel if and where they can. With exception of the automobile industry, no rush is occurring on the part of consumers to place unvalidated business for third quarter and later.

Cincinnati — Sheet cancellations are numerous, but fail to affect the overall tight mill situation. Deliveries are behind schedule, due to previous overloads. Any gaps in schedules are quickly filled, and new orders for military needs continue. Inquiries from manufacturers of consumer goods, and the if-and-when orders are piling up, as mills await a clarification of reconversion policies.

Steel Bars . . .

Bar Prices, Page 186

Little reflection of cutbacks has appeared in steel bars, though more extensive cancellations are expected. One factor is reduction of the Army aircraft program. Considerable civilian demand is awaiting booking, dependent to a great degree on the extent of reduction in the shell program. Plain carbon bar deliveries are in fourth quarter and hot-top quality in first quarter in most instances.

Philadelphia — Deliveries in plain carbon bars fall in fourth quarter and hot-top quality bars in first quarter, with larger sizes well into that period and in some instances beyond. Alloy and other special bars may be affected by the cutback in Army aircraft, although motor requirements in other directions should take up much of the slack. At present alloy bars are being quoted for late October and November in electric furnace grades and December in open-hearth analyses. Cold-drawn bar shipments also fall late in the year and even beyond on larger sizes, reflecting particularly requirements of the rocket program.

Boston — Revisions are under way which will affect forward orders placed with mills by converters and cold finishers of bars, strip and other products. Starting in July orders for hot-olled stock will be on a sales replacement basis, April volume being the gage for that month. In many instances forward orders from cold finishers are in with mills well into next year and those with or without directives are affected. A large part of this volume is expected to be canceled. Cutbacks thus far affect bars more than other products, including small arms and artillery components, heavy chain and in one case a forge shop. Forge shops in any way connected with the truck program are not affected, although prospective tonnage for aircraft tends lower. Half a dozen shops in Connecticut are hit by artillery component revisions. Some mills now quote open-hearth and electric furnace alloy bars and billets for July delivery, compared with November and August, respectively, a month ago. Cold-finished alloy deliveries for November are unchanged. Improved deliveries are also promised by some cold-drawn mills, including rounds to 1 7/16-inch, and hexagons and squares to two inches in November from former January promise.

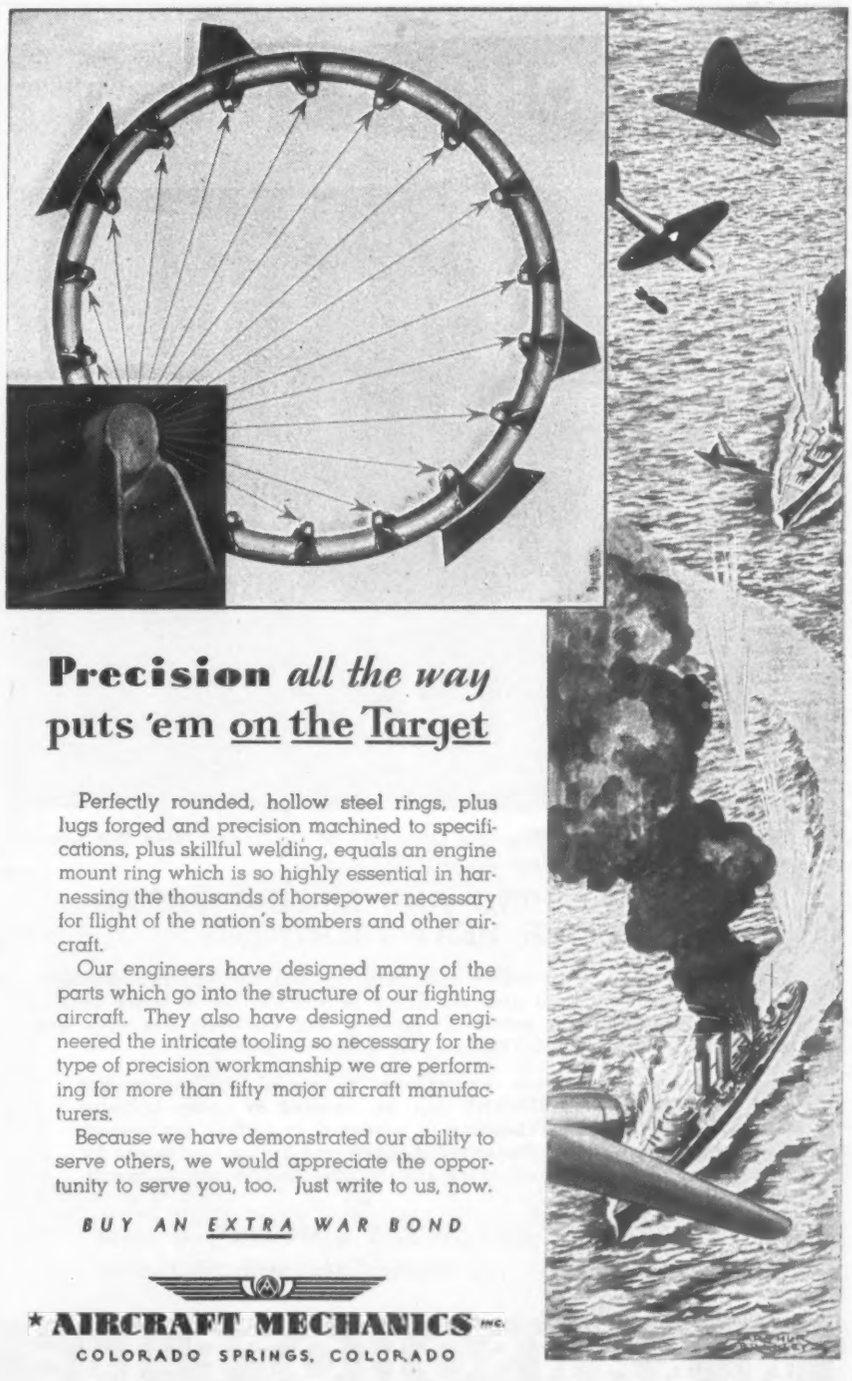
Pittsburgh — Although a substantial cancellation of bar tonnage is in prospect as the shell program recedes, particularly in heavier items, up to the present there has been no reflection on mill books. A heavy volume of civilian demand could be placed if final word on the shell programs were available. Published reports of contract cancellations have not been followed by letters of cancellation, and the steel producer is left holding the bag, which is at this point quite a full one. Much of this tonnage will, of course, be canceled before July 1. Right now, however, anxious customers are bombarding their suppliers with requests for delivery dates in order to set up their own production lines.

Chicago — Despite cutbacks in the shell program, pressure for bars, both carbon and alloy, continues great. Reason is that cutbacks bear more heavily on future schedules than current production. Within another 30 to 60 days some easing may be observed, but considerable order tonnage is in hand ready to be inserted in schedules when this is possible. Agricultural implement manufacturers are ready to utilize considerable amounts of bars, and from all indications will continue on CMP during third quarter.

Steel Plates . . .

Plate Prices, Page 187

Increased buying of plates is offsetting to some degree the loss in tonnage for shipbuilding and with unrated orders coming to mills deliveries are being pushed further ahead. Numerous outlets for plates are appearing, notably for



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lend-lease and for river craft. Considerable export business is looked for to give additional tonnage within a short time, if shipping space is available.

Philadelphia — While some universal plate tonnage still is available for June and one large producer has sheared plate for July most sheared plate mills are now quoting August, due in part to an increase in unrated steel orders. In addition to lend-lease tonnage for France plate producers expect substantial tonnage for the Scandinavian countries and Holland in third quarter, provided shipping space is available. Recent OPA price revision included a $3 per ton advance in carbon steel floor plates, with the market now at 3.50c, Pittsburgh and Chicago. As no interim increase was granted on floor plates the present advance is the same as on carbon plates.

Pittsburgh — Some buying from warehouses and shipyards is coupled with increasing volume of new construction in helping to hold plate tonnage at fairly high levels. Tonnage is available for virtually immediate delivery, however, in almost any size required. New river transport programs are now shaping up which will require a substantial number of barges over the balance of this year and also a fair tonnage of plates for towboats, dredges and similar river craft which have not been manufactured during wartime. Increase in the ODT transportation program which permits construction of a larger number of freight and passenger cars during last half will probably be translated into plate demand during June although specifications against the increased program have not yet been received.

Boston — Buying is slow, with deliveries back to normal lead time on most widths. Cancellations include narrow plates required for sheave blocks in Maine, a direct reflection of lower shipbuilding activity, and an aircraft windshield subcontract. Most orders are in for current shipbuilding.

St. Louis — Production of plates continues to decline with demand, and an increasing portion of capacity is being shifted to sheets. Deliveries have advanced to September and later. The labor situation is bringing continued difficulty in finishing and shipment of some tonage is being held up. Output principally is for Maritime Commission ship repairs.

Chicago — Plate situation here is such that mills can take business for September and later. This district now is producing little plate tonnage for West Coast, virtually all of this having been removed by WBP and distributed elsewhere. In the meantime, this loss of tonnage has been offset by increases in the bomb program, the material to be shipped to bomb makers in the midwestern area. Platemakers can furnish floor plates in connection with the Navy's 1945 pontoon program increase of 25 per cent, but whether the program can make headway is dependent upon whether sheets can be obtained.

Wire . . .

Wire Prices, Page 187

Boston—New volume of unrated inquiry is well in excess of cancellations, which are minor at mill level thus far, although more are expected in June. Openings in nearby schedules are not yet developing. Most drawn wire deliveries are in fourth quarter, which is also the earliest in rods. Orders for screw stock and bolt sizes are in with mills to the extent of allotments, which in some cases carry into fourth quarter. More consumers in this category are buying a heavier ratio of drawn carbon wire, rather than finishing their own from rods. Volume of open-hearth carbon is also relatively higher than bessemer, despite large quantities of screws and other small fasteners appearing in surplus lists for sale. Demand for new fabricated material is holding well. Approximately 400 tons of wire will be required for recent purchases of steel wool by the services.

Cleveland—Tightest situation in wire products appears to be in nails, which are tightest in a long time. Lend-lease is taking large tonnages for reconstruction in Europe and the Army has heavy demands for building in the Pacific areas. Experiments have been made in a new type of fiber container instead of wooden kegs, which have been breaking, with resulting loss of many nails. The fiber containers have withstood rigorous tests and are being used to a great degree.

Tin Plate . . .

Tin Plate Prices, Page 187

Chicago — Tin plate output in this district will be increased slightly in third quarter, several makers having been given higher production directives for the period. The increase is less than WPB had sought, but manpower deficiency prevents raising schedules higher. First openings currently are in October.

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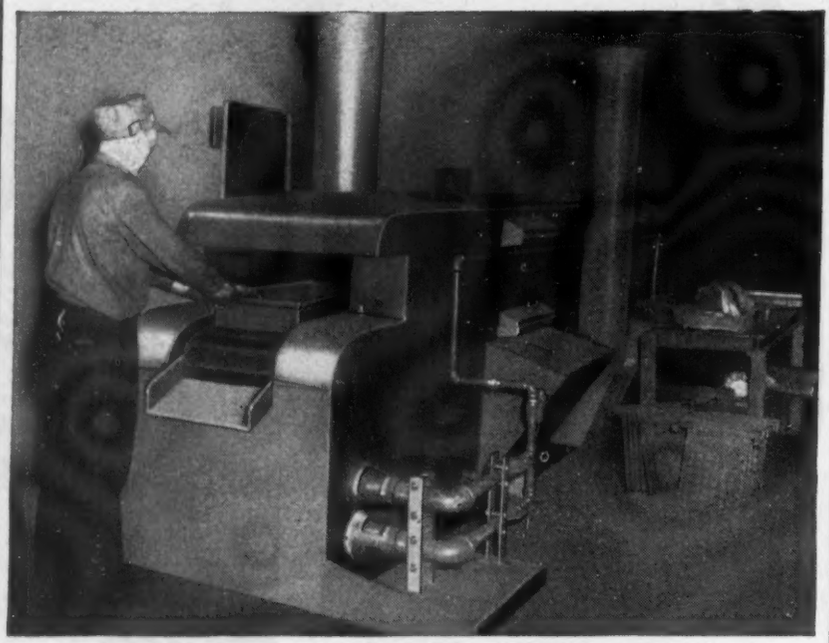

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Rails, Cars . . .

Track Material Prices, Page 187

New York — Bids will be taken June 8 on 30,000 twenty-ton composite freight cars for France. The equipment includes 20,000 box cars and 10,000 gondolas, with bids handled by the War Department for the Foreign Economic Administration. Bids will also be opened June 11 by the War Department for FEA on 4000 box cars and 2000 gondolas for India. Both the French and Indian equipment is for delivery during the first three quarters of 1946. Also reported pending are 6750 box cars, 1500 forty-ton gondolas, all of composition material, for France, which also will be handled by the War Department for FEA.

Domestic demand includes 100 seventy-ton hopper cars for the Detroit, Toledo & Ironton. The Atlantic Coast Line is reported to be negotiating for 300 fifty-ton gondolas with the Brunswick Marine Construction Corp., Brunswick, Ga.

Structural Shapes . . .

Structural Shape Prices, Page 187

New York — Inquiry for structural shapes linked with automobile industry reconversion is heavy, including 18,000 tons for buildings for Buick at Flint, Mich., and Wilmington, Del. For warehouse structures greatly needed for surplus and excess storage 50,000 tons of all-metal buildings have been placed.

Boston — With a 500-ton bridge at Springfield, Mass., closing June 5, inquiry for bridge work is slightly heavier. With few exceptions, however, structural fabricating shops are seeking tonnage. The exceptions are those building outboard frames and subcontracting on portable aircraft hangars. At least two shipyards in this area during the war have equipped fabricating shops, notably in welding and report is that one, at least, will engage in general structural fabricating after the war. This is given impetus by the fact that one shipyard in Connecticut took out plans for a 300-ton deck plate girder span at Conway, N. H., which closed last week. Sheets are slightly easier for the most part, reflecting openings in shell steel, although August is the best month on scattered sizes, with others in September.

Pittsburgh — According to the estimate of American Institute of Steel Construction, more new construction work has been out for bids and awarded recently than at any time in the past three years. The volume is still relatively small, however, and will probably continue a slow upward climb as reconversion progresses. Reportedly a large number of new factories are to be built as soon as the civilian goods program begins to roll, and already there have been a number of these jobs open for bids, particularly in the automotive industry. Several large housing projects are pending, and plans for literally dozens of highway bridges are ready to go and will probably reach bidding stage in third quarter.

Chicago — Recent cancellations of Bailey bridges by the Army is affecting some fabricators severely, and they may soon be looking for tonnage for construction. Likewise, volume of work in building ship components is running out. Structurals are in easy position today, delivery in August being possible. In spite of this, new prospects for building construction are coming out slowly.

Philadelphia — Shape deliveries have stiffened, with all leading producers now quoting September on both standard and wide-flange sections. About a week ago one producer was offering July shipment on wide-flange. John McShane, Philadelphia, has been awarded the general contract on work at the Navy air supply depot in Philadelphia, requiring 1050 tons of shapes.

New York — Structural inquiry is featured by 2000 tons for five buildings for the Navy supply depot at Scotia, N. Y. Other inquiry includes a few hundred tons pending for a kettle house for the Colgate-Palmolive-Peet Co. at Jersey City, N. J. George A. Fuller Co., Washington, is taking bids on 2500 tons of structurals for an ore reducing plant in West Virginia.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 187

New York — Bids are being taken for the third time on approximately 500 tons of reinforcing bars for a project by the New Jersey Housing Authority, on which the Rubin Construction Corp., 11 West Forty-second street, New York, is general contractor.

Pig Iron . . .

Pig Iron Prices, Page 189

While no distress has occurred in pig iron supply there are tight spots and in some areas consumers are operating on

a day to day basis. Releases on civilian goods have brought a flood of castings orders, which foundries are unable to accept under present labor conditions. Third quarter buying lags but is expected to equal present demands.

Philadelphia — Except for a substantial order for basic iron little third quarter buying of pig iron has yet appeared. However, there is livelier general interest with prospects for fairly sustained consumption in that period, allowing for such seasonal influences as vacations and hot weather slowing.

Pittsburgh — Situation continues critical at many points, with merchant iron short and foundry demand heavy. The release of controls on civilian goods manufacture has resulted in an influx of inquiry to foundries in this district with many buyers offering firm orders with guaranteed tonnage for one to two years ahead. Iron supply at the moment is so precarious that most melters are operating on a day to day basis. Basic iron demand holds firm to increasing. Manpower shortage continues to restrict blast furnace operations, but there is a possibility that output will be boosted by the addition of at least one stack soon.

Boston — Shrinkage in subcontracts by several larger consumers of pig iron as labor supply improves for reconversion is indicated. With prospective decline in war contracts melt in these foundries will be heavier, notably in the textile mill equipment, paper mill and shoe machinery fields. Until 30-day limitation on inventories is lifted, buying continues meshed to that regulation; substantial number of smaller shops continue to buy on a monthly basis, in effect maintaining policy established during allocations. Consumers of basic in most instances would stock iron more heavily, insurance against shortage which prevailed during the winter. All basic and most foundry grades continue to move in from outside furnaces with the district producer out of blast and reserves declining steadily.

The district cast iron pipe foundry has bought pig iron for the first time in months, taking first from the Everett furnace for resumption of operations on a limited basis. Reserve stocks at Everett furnace, however, are becoming out of balance and depleted. Additional malleable and foundry grades will come from outside sources shortly. Although furnace inventory is down to a low level resumption of pig iron production is uncertain as regards ore and prospective fuel requirements in New England.

Cincinnati — Books are now being opened for third quarter pig iron with every indication, judging by recent informal inquiries, that demand for tonnage will be equal, at least, to that in either the first or second quarters. Some furnaces are lagging with shipments, creating anxieties because stocks almost generally are slim. Middle interests report there is no surplus tonnage. By-product, foundry coke is in easier supply, and tapering in specifications is noted.

Buffalo — In spite of rumored cancellations in many lines early negotiations for third quarter pig iron bookings indicate little, if any, appreciable change from current quarter buying. Except for odd lots demand continues to absorb production. Sellers report foundries do not fear the possibility of being caught with stocks. The opinion prevails that foundry reconversion involves no major problems. Makers of railroad castings are among the busiest operators at present. Strong demand for basic also continues.

Scrap . . .

Scrap Prices, Page 190

In general trading in scrap is dull, with numerous consumers out of the market, awaiting developments. Prices on steelmaking grades show no change, ceiling prices prevailing in all areas except eastern Pennsylvania, where softness appeared a fortnight ago. Weakness continues in turnings but cast scrap is scarce and strong. Shipments of steelmaking grades from the West Coast to the Midwest have been discontinued because of heavier demand at home, with lighter production as shipbuilding declines.

Pittsburgh — No change is reportable in the Pittsburgh market. Sales of No. 1 heavy melting steel at ceiling price plus springboard have been reported in the past week, and demand remains high. There is continuing weakness in less desirable grades of turnings. Cast scrap is critically short. Heavy low phos has commanded ceiling prices although volume involved in recent sales is small.

Philadelphia — While there is conflict of opinion on the future outlook in scrap overall sentiment is fairly strong and prices for the first time in a month show no change. The leading eastern Pennsylvania consumer of steel scrap is still practically out of the market while certain others are pressing harder for tonnage than for some time.

Boston — Slight, if any easing, is apparent in the tight supply of cast scrap with prices at ceiling. Heaviest inventories are held by the several textile mill equipment shops and some look large in view of meager reserves held by most gray iron foundries. However, intake of cast scrap by textile machinery builders has and is below normal, although likely to increase as these shops increase textile mill replacements. Most old machines usually come in as scrap when replaced by a new unit. Outright replacements have been limited for a long period, during which, most normal volume has been on repair and replacement parts, automatically reducing scrap available. As regards tire cord output new machinery has been mostly for expansion and old equipment kept in operation, thus releasing little scrap.

With completion of old contracts early this month scrap prices will undergo further test, with the trend uncertain and easy on lighter industrial grades, notably turnings. Unprepared steel scrap is also softening at $8 to $8.50.

St. Louis — Steel mills here are out of the remote scrap market and take local material only. Consumers are expected to withhold orders for several weeks, until a more definite government cutback plan is apparent. Scrap shipments are off sharply, with no takers for a glut of machine shop turnings.

Los Angeles — WPB allocations of shipyard scrap are being directed wholly to local mills, shipments eastward having been discontinued because of increased demand here. Mill reserves are still well ahead of the 45-day minimum supply. While No. 1 industrial scrap from shipyards is at ceilings, sales by dealers are below maximum. Dealers

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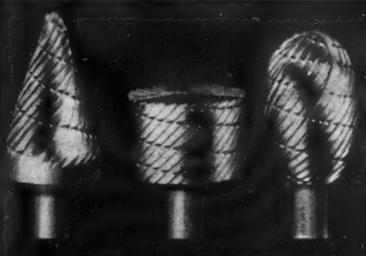

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claim that prices are edging toward ceiling as buyers realize that with the decline of shipbuilding scrap from that source will continue to shrink.

Cleveland — While no change has appeared in prices of heavy melting steel and other steelmaking scrap, cast scrap and other grades which have remained at ceilings, there appears a tendency for machine shop turnings to command better figures. Cancellations affecting machine shops have reduced production but demand for blast furnace use remains strong. Dealers are slow to close on current offerings, foreseeing a probable higher price. Outlook for June demand is good and a rise in machine shop turnings would affect related grades, as well.

Buffalo — Efforts by a large consumer to lower prices has caused something of a deadlock. Buying interest has practically vanished as developments are awaited. In addition to lowering offered prices one consumer has canceled all steelmaking grades. About 2400 tons have arrived recently by canal.

New York — Continued heavy demand from Pittsburgh dominates heavy melting steel buying here with prices on all grades unchanged.

Cincinnati — A small tonnage of iron and steel scrap was purchased recently by an upriver mill at ceiling prices. This was the only recent test of price in the district market, which is considered firm on heavy grades, and still tending weak on borings and turnings.

Chicago — While war cutbacks are not affecting steel mill operations, they are beginninig to reduce production of scrap, with the result that demand for melting material is strengthening. Heavy melting grades of scrap are none too plentiful and hold ceiling prices firmly; less desirable material enjoys better demand and this is reflected pricewise. Confusion exists over prices on loose machine shop turnings and baled turning bundles. The $10 mill offer on the former recently attracts little interest and consumer sales have been heard as high as $12, this being an advance of $1 over the previous level. A spread of $10.50 to $12.00 is required to represent various shades of opinion. The range of $16.25 to $16.75 for baled machine shop turnings is widened to a top of $18.50, some sales at the higher level being reported.

Warehouse . . .

Warehouse Prices, Page 188

Cincinnati — Warehouse demand is being maintained near peak levels, with no apparent effect from cutbacks which are probably less severe here than in some districts. A feature is heavy sales of structurals, against which the supply has been more or less adequate. Bars, except in high carbon and certain specialties, and heavy plates, are also fairly abundant. Deliveries lag frequently when cutting and shearing are required.

Cleveland — Irregular demand for steel from warehouse is noted and at present there is a lull. Sheets are in strong demand, without letup. Assortments are fairly good, though some gaps are present. No reason is apparent for the current slack demand and renewed buying is expected to come out soon.

Los Angeles — Steady downtrend in volume of warehouse sales has held since March, which was the peak month. Shortages continue in all major items,

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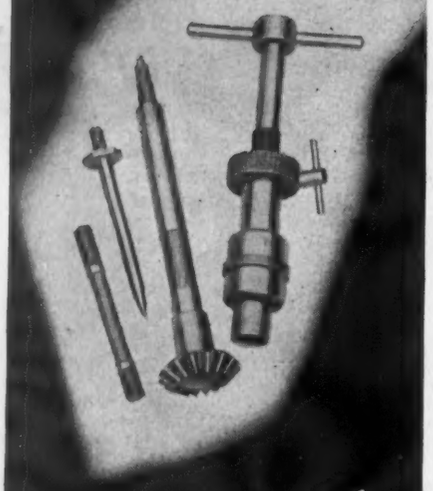

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with galvanized sheets and pipe at new lows in supply. Jobbers are troubled by OPA order to give up price increases allowed Jan. 11 and inability to pass on further mill increases put in effect May 23.

Chicago — Warehouses here will require a few more days to get caught up on deliveries to customers which were held up by the week's strike of union truck drivers ended May 22. New business holds at about the same level as recently, cutbacks in war contracts thus far being little observed. With the approaching open ending of CMP July 1, distributors are beginning to get inquiries for civilian or unrated steel.

Nonferrous Metals . . .

Nonferrous Prices, Page 191

New York — Maximum price of 4.95 cents per pound, f.o.b. point of shipment, for zinc base forming and stamping dies sold as scrap has been established. This is in line with ceilings established for other grades of zinc scrap materials. A quantity premium of one-half cent per pound is permitted on shipments of 20,000 pounds or more of the new grade either separately or in combination with die-cast scrap, old and new automobile radiator grilles, and old die-cast scrap.

Expansion of the aircraft industry during the war has resulted in greatly increased use of forming and stamping dies made of zinc base alloy. Because a larger volume of this material is expected to enter the scrap market, and in response to requests from the scrap industry, the additional classification of scrap is being provided.

Heavier use of 0.75-pound electrolytic tin plate for evaporated milk cans during the balance of the year will result in saving an estimated 645 tons of tin; about 400 tons will be conserved in last quarter when 14½ ounce cans will be fabricated in addition to six-ounce, the latter to be first made. Volume in evaporated milk cans is larger than any other type.

Cutbacks are developing in heavier volume at Connecticut brass plants. As in other districts, this is reflected in smaller demand for copper, June delivery, with trends toward reduction of inventories. Despite increasing prospects for more copper and copper alloy products in civilian production next quarter, the downward trend starting in April is not likely to be substantially halted through June and May was below April.

Copper wire mill products which a warehouse may order for stock replacement in any calendar month is increased by WPB from 25 per cent to 33 1/3 per cent of second 1944 quarter deliveries. Until July 1 warehouses also may enter deferred warehouse stock orders provided the total does not exceed 33 1/3 per cent of deliveries in second 1944 quarter.

Metallurgical Coke . . .

Coke By-Product Prices, Page 187

Pittsburgh — Some confusion surrounds the new coke prices covering beehive furnace and foundry grades. The order was not clear as to the reason for an apparent 25-cent discrimination against hand-drawn oven operators, nor is there agreement as to the effect on premium coke prices. The latter is purely an academic argument as far as the local district is concerned, as the only producer of premium coke is now out of production and has no plans for immediate resumption. Some quarters are undecided as to the price on foundry coke, but most sellers are increasing the same 50-cent level on both furnace and foundry coke.

Steel in Europe . . .

London — (*By Radio*) — Substantial tonnages of plates are required for building locomotives, and freight cars and for boilermakers in Great Britain but shipbuilding demand is slower. Demand for sheets is the high spot in the finished steel market.

Canada . . .

Toronto, Ont. — In the Canadian steel markets as a whole, new order placing is sustained and so far cutbacks on war account have had no effect on production. Mill officials do not look for curtailment in production but point out that slackening war demand will be more than exceeded by increased requirements for expansion in manufacture of consumer goods of all types. On most lines of production mills now are almost solidly booked to the end of this year, with most recent business showing a definite swing to peacetime channels. While the government had dropped many controls all ceiling prices are being maintained. Despite the mark-up in United States steel prices and appeals made by Canadian steel producers for higher prices there has been no lifting of the ceiling at levels established at the beginning of the war. According to word from Ottawa there is no intention of permitting higher prices for steel in the immediate future. This action is taken in an effort to stop any inflationary move that might develop in the early postwar period.

Demand for steel plates continues to improve and while mills are fairly well booked, with delivery extending about three months there is no actual shortage. Announcement was made recently to the effect that the federal government soon will take over the plate mill at Halifax from Dominion Steel & Coal Corp.

Demand for merchant bars, both carbon and alloy, is only slightly behind that for sheets and mills report only small unfilled capacity to the end of the year. Demand is equally heavy for all sizes of bars. Curtailment in some branches of war production has not eased the supply situation.

Merchant pig iron sales are holding at about 8000 tons per week, with sales for the past week running approximately 5000 tons of foundry iron, 2000 tons of malleable iron and 1000 tons of basic iron. Melters, however, continue to buy as demands dictate and are receiving prompt delivery on new orders.

Scrap receipts are at top volume for the year and deliveries to steel mills are now in excess of requirements. In addition to deliveries from eastern Ontario, shipments also are being received from the mining centers in the north and from western Canada. While there has been improvement in supply of cast scrap and stove plate, dealers continue to spread their supply over as many customers as possible and there is not sufficient coming in to meet all requirements.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

640 tons, Aquai River bridge, Richmond, Fredericksburg & Potomac railroad, to American Bridge Co., Pittsburgh.

300 tons, freight depot and office building, Indianapolis, for New York Central railroad, to Midland Structural Steel Co., Cicero, Ill.; Walsh Construction Co., Cleveland, contractor.

290 tons, body plant, Studebaker Corp., South Bend, Ind., to Mississippi Valley Structural Steel Co., Decatur, Ill.; S. N. Nielsen Co., Chicago, contractor.

STRUCTURAL STEEL PENDING

2000 tons, transit sheds, Stockton, Calif., for U. S. Navy.

500 tons, bridge Springfield, Mass.; bids June 5.

300 tons, manufacturing building, Columbia Pipe & Supply Co., Chicago; bids June 4.

300 tons, roof remodeling, Glenn L. Martin Co., Baltimore; bids closed.

250 tons, naval ordnance laboratory, White Oak, Md.; bids June 1.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1000 tons, body plant, Studebaker Corp., South Bend, Ind., to Bethlehem Steel Co., Bethlehem, Pa.; S. N. Nielsen Co., Chicago, contractor; bids May 17.

830 tons, George Washington hospital addition, Washington, through C. H. Tompkins, that city, to Bethlehem Steel Co., Bethlehem, Pa.

540 tons, veterans hospital, Fargo, N. D., for U. S. Veterans Administration, to Ceco Steel Products Corp., Chicago; Hegstrom Construction Co., St. Paul, contractor; bids April 24.

330 tons, power station, Beloit, Wis., for Wisconsin Power & Light Co., to Concrete Steel Co., Chicago; bids May 2.

275 tons, expansion, Bauer & Black Div., Kendall Co., Chicago, to Bethlehem Steel Co., Bethlehem, Pa.; Avery Brundage Co., Chicago, contractor.

186 tons, grain elevator, Indianapolis, for Indiana Co-operative Grain Association, to Laclede Steel Co., St. Louis; G. T. Burrell, Chicago, contractor.

REINFORCING BARS PENDING

500 tons, veterans hospital, Sioux Falls, S. D., for U. S. Veterans Administration; McGough Bros., St. Paul, low on general contract; bids May 22.

275 tons, Cherryville Hill housing project; bids asked through C. H. Tompkins, Washington.

Unstated, war housing project, 47th street, Chicago; bids June 6.

PLATES . . .

PLATES PLACED

177 tons. tanks, Lockport, Ill., for Globe Oil & Refining Co., to Graver Tank & Mfg. Co. Inc., Chicago; 300 tons additional abandoned.

Unstated tonnage, steel water tank and tower, veterans' hospital, Fargo, N. Dak., to Chicago Bridge & Iron Co., Chicago, $15,940.

PIPE . . .

CAST IRON PIPE PLACED

425 tons, mainly 12-inch, Andover, Mass., to U. S. Pipe & Foundry Co., Burlington, N. J.

140 tons, 10-inch, Quonset Point, R. I., to U. S. Pipe & Foundry Co., Burlington, N. J.

135 tons, 8 and 10-inch, Hartford, Conn., to U. S. Pipe & Foundry Co., Burlington, N. J.

RAILS, CARS . . .

RAILROAD CARS PENDING

Atlantic Coast Line, 300 fifty-ton gondolas; may be placed with Brunswick Marine Construction Corp., Brunswick, Ga.

Detroit, Toledo & Ironton, 100 seventy-ton hopper cars.

LOCOMOTIVES PLACED

Boston & Maine, three 1000-horsepower diesel switching locomotives to American Locomotive Co., and one 4000-horsepower passenger diesel to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Transition to Civilian Production Is Slow

(*Concluded from Page 76*)

large portion of the people will be doing what they always have done.

WPB Chairman Krug estimates that of the 51,200,000 civilian workers, 44,600,000 are in jobs which will continue regardless of munitions schedules and that only 6,600,000 are in jobs likely to be affected by cutbacks. A breakdown of employment shows 7,750,000 in agriculture, 3,800,000 in transportation and utilities, 600,000 in construction, 800,000 in mining, 11,400,000 in trades and services, 800,000 in iron and steel manufacturing, 2,000,000 in machinery manufacturing, 7,700,000 in other manufacturing, 4,400,000 in government (excluding war agencies), and 5,350,000 in miscellaneous industries unlikely to be affected by cutbacks. In the munitions industries are 1,600,000 in aircraft, 1,300,000 in shipbuilding, 1,800,000 in ordnance and signal equipment, 300,000 in war chemicals and 1,600,000 in federal war agencies.

Mr. Krug's assumption that workers in iron and steel, machinery and other manufacturing, transportation, construction and other civilian activities will not be affected by cutbacks in the war program appears fallacious; these essentially civilian activities certainly will reflect any diminution in the munitions program in decreased employment.

In the matter of tools and facilities for civilian products, the picture is spotty. New tools in many cases cannot be obtained in under eight months. Some manufacturers may be able to call upon their ingenuity and improvise facilities for the transition period, but orderly and efficient assembly lines for many civilian manufacturers are not in immediate prospect.

WPB has made a good start in relaxing its controls. Out of a total of 650 orders and schedules in effect April, 156 already have been revoked and an additional 83 will be lifted within the next six weeks.

Guidance in reconverting to peacetime goods is being offered in the appointment of reconversion chairmen for about 400 industries. These men will help the various industries in their reconversion problems by acting as liaison between the government and the industry and in other ways.

Other agencies are moving toward meeting the reconversion problem. The Surplus Property Board is offering to sell government-owned machine tools and other equipment in manufacturers' plants immediately. Small manufacturers making essential civilian products are being offered loans by the Smaller War Plants Corp. on a liberalized basis. SWPC has authorized its regional agents to make loans up to $50,000 without awaiting

WATER SYSTEMS

For Cities, Towns and Industries

Practically all of Layne's emergency War Plant Water System construction has been finished. Essential Civilian Industries, Cities, Towns and Villages are next in line. The entire Layne organization is now devoting almost full time to peace-time Water System installation. This means that Industrial, and City Officials — Engineers and Plant Superintendents, can now proceed with their Well Water Sytems development plans.

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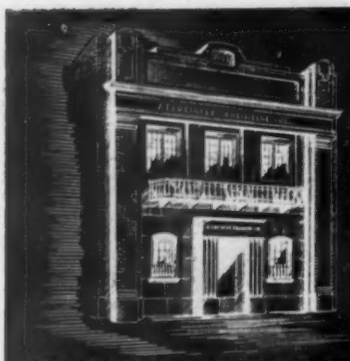

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Washington approval or up to $100,000 where banks participate for 20 per cent.

War Manpower Commission called 48 top management and labor officials to Washington last Friday for a discussion of manpower and production problems as they have developed since the defeat of Germany. From this meeting, WMC expects to obtain definite recommendations for the timing of relaxation of its controls.

CONSTRUCTION AND ENTERPRISE

OHIO

ARCHBOLD, O.—King-Wise Mfg. Co. plans a two-story 100 x 200-foot farm implement manufacturing plant to cost about $200,000. Britsch & Munger, Nicholas building, Toledo, O., are architects.

CANTON, O.—Tomco Inc. has been incorporated to manufacture machine parts, tools and equipment by M. J. White and associates, with $500 capital and 500 shares no par value. Wesly Meinerding is agent.

CLEVELAND—Oster Mfg. Co., 2067 East Sixty-first place, will build a one-story 84 x 146-foot machine shop addition and make alterations to present plant, at cost of $52,000.

CLEVELAND—Stainless Welding & Mfg. Co. has been incorporated with $500 capital and 3750 shares no par value to manufacture stainless steel products, by Horace C. Voloun, 1180 Union Commerce building, and associates.

CLEVELAND—Euclid Road Machinery Co., 1361 Chardon road, care E. H. Parkhurst, has purchased two adioining parcels comprising 35 acres at St. Clair avenue and East 222nd street as first step in plant expansion when restrictions are relaxed.

CLEVELAND—Grinders & Fixtures Inc. has been formed by George G. Auer, president, and C. B. Saunders, vice president, to acquire manufacturing rights of circular leaf grinders and index heads from Cleveland Tool Engineering Co., 1255 West Fourth street. Company will be located at that address until other space is obtained.

COLUMBUS, O.—Jaeger Machine Co., 550 West Spring street, has let contract to Robert T. Setterlin & Son, 1030 South Third avenue, for a one-story, 132 x 278-foot foundry, to cost about $80,000. A. Lyman, care owner, is architect.

FINDLAY, O.—Master Tire & Rubber Co., J. F. Schaefer, president, Lime and Western avenues, has let contract to the Austin Co., 16112 Euclid avenue, Cleveland, for a one-story 100 x 340-foot truck tire plant, estimated to cost about $180,000.

MEDINA, O.—Henry Furnace Co., H. F. Bradway, manager, is converting its 50 x 200-foot tin shop to shell container production exclusively, much heavy equipment being installed.

MT. VERNON, O.—Cooper-Bessemer Corp., North Sandusky avenue, will build a diesel engine plant at cost of $14,000, starting immediately.

McCONNELLSVILLE, O.—Cambridge Tool Corp., W. J. Blazier, vice president, care Lempco Products Inc., 5400 Dunham road, Bedford, O., plans a one-story plant to cost about $750,000.

ILLINOIS

CHICAGO—Ingersoll Steel & Disc Division of Borg Warner Corp., 310 South Michigan avenue, is having plans drawn by A. J. Boynton & Co., engineers, same address, for a one-story 130 x 400-foot plant addition.

CHICAGO—Columbia Pipe & Supply, 3610 South Morgan street, will let contract soon for a one-story plant. A. Epstein, 2001 West Pershing road, is engineer.

EL PASO, ILL.—City council has authorized Warren & Van Praag Engineering Co., Decatur, Ill., to draw plans for a water softener system, including building and equipment, estimated to cost about $58,000.

HERRIN, ILL.—Borg-Warner Corp., Howard E. Blood, president, 310 South Michigan avenue, Chicago, is negotiating for a factory site at Herrin where its Norge division plans to concentrate its laundry equipment production.

COLORADO

DENVER—Denver Glass Bottle Co., 3557 Wazel street, will let contract soon through E. G. Groves, architect, Temple Court building, for one and two-story 60 x 100-foot and 56 x 60-foot L-shaped bottle manufacturing plant to cost $75,000 to $100,000.

MINNESOTA

MINNEAPOLIS—V. A. Boker & Sons, 3104 Snelling avenue, manufacturer of machinery and metal stampings, has let contract to Victor Carlson & Sons Inc., for a one-story machine shop addition 25 x 115 feet.

MINNEAPOLIS—Micromatic Metal Products Co., 1921 Bryant avenue South, has been incorporated to manufacture screw machine products, by Hyman Edelman, Sidney Larber and E. A. McGarvey.

IDAHO

KELLOGG, IDAHO—Bunker Hill & Sullivan Mining & Concentration Co. plans a 250-ton ore mill at Sidney mine, to cost about $200,000.

MONTANA

ROUNDUP, MONT.—Roundup Coal Mining Co. plans to open new coal mine with 3500 tons daily capacity, with railway spur.

MUSCATINE, IOWA—H. J. Heinz Co. has let contract to J. H. Hunzinger Co., Security building, Davenport, Iowa, for a one-story plant 180 x 300 feet, to cost about $200,000.

SOUTH DAKOTA

HURON, S. DAK.—Graham Distilling Co., H. H. Graham, president, plans immediate construction of an industrial alcohol plant to cost about $300,000.

ARKANSAS

BLYTHEVILLE, ARK.—Southern Mfg. Co., A. A. Mauley, president, plans erection of a plant costing about $50,000.

JONESVILLE, ARK. — Hargrove Industries Inc., plans erection of Soybean crushing plant and cottonseed oil mill to cost about $150,000.

MICHIGAN

DETROIT—Hydraulic Services Inc., 1440 Garland avenue, has been incorporated with $1000 capital to manufacture hydraulic machinery and equipment, by Claude W. Albers, 1440 Oakland avenue.

DETROIT—Shreve, Anderson & Walker, 914 Marquette building, has been given contract for manufacturing and office building at Middleville, Mich., for the White Products Corp.

GRAND RAPIDS, MICH.—Grand Rapids Brass Co., has let contract to Strom Construction Co., Grand Rapids, for an additional plant building, to cost about $87,000.

HIGHLAND PARK, MICH.—Utility Tool & Mfg. Co., 12236 Second avenue, has been incorporated with $25,000 capital to manu-

facture machinery and equipment, by August A. Leberman, 16 Cortland street, Highland Park.

CONNECTICUT

NEW HAVEN, CONN.—New England Die Casting Co., 54 Grant street, West Haven, has plans by L. Asheim, 211 State street, Bridgeport, Conn., for a 50 x 200-foot factory on Front street, to cost about $40,000.

PLAINFIELD, CONN.—Plastic Film Corp., care architect, is having plans drawn by L. F. Caproni, 1221 Chapel street, New Haven, Conn., for a one-story 42 x 200-foot plant addition, four reinforced silos and a 30 x 100-foot platform, to cost about $45,000.

RHODE ISLAND

PROVIDENCE, R. I.—Hugold Anderson, 36 Garnet street, has plans under way by E. O. Ekman, 1016 Turks Head building, for a two story 46 x 93-foot factory, to cost over $40,000, with equipment.

MASSACHUSETTS

INDIAN ORCHARD, MASS.—Nixon Specialty Co., 36 Berkshire street, has revised plans by E. P. Dorgan, 833 Chestnut street, Springfield, Mass., for one-story 40 x 50 and 50 x 122-foot plant buildings on Berkshire street, former bids being rejected.

PITTSFIELD, MASS.—General Electric Co., 1 Plastics avenue, has let contract to E. J. Cramer, 28 North street, for a one-story plastics plant, including laboratory and machine shop, estimated to cost about $40,000.

NEW YORK

BUFFALO, N. Y.—Small Steel Castings Inc. has been incorporated by Joseph J. Cheney, president, and will operate a foundry at 343 Howard street, where equipment costing about $100,000 is being installed. After termination of contracts for war work, automotive and agricultural work will be done.

PENNSYLVANIA

LANCASTER, PA.—Lehigh Foundries Inc., Lancaster, has taken over operation of the Lancaster plant of the Merchant & Evans Co. and plans a $150.000 postwar program of refrigeration compressor production.

PORT ALLEGHANY, PA.—Pittsburgh Corning Corp. has let contract for design and construction of a plant addition for production of foamglass, to John W. Cowper Co. Inc., Sidway building, Buffalo, to cost about $100,000.

SUNBURY, PA.—Susquehanna Wire Rope Co., recently formed to manufacture a new type of wire rope by a process developed by Prof. William T. MacCreadie of Bucknell University, has leased space in the C. W. Rabuck warehouse and will start operations early in June.

INDIANA

RICHMOND, IND. — Richmond Automatic Screw Corp., 1234 South Ninth street, has been incorporated with 100 shares no par value, by H. Smith, G. Lee Laughlin and Howard E. Sill.

WINCHESTER, IND.—Overmyer Mould Co. of California Ltd. has been incorporated with 4000 shares at $50 per share, to manufacture dies, castings and molds, by C. P. Overmyer Sr. and associates.

MISSOURI

ST. LOUIS—Stok-A-Fire Co., 6504 Olive street, has bought 125 x 150 feet adjoining its plant for plant expansion.

ST. LOUIS—William R. Warner & Co. Inc., 404 South Fourth street, plans a six-story plant to cost over $500,000.

ST. LOUIS—Cupples Co., Seventh and Spruce streets, manufacturer of tubes, cutters, etc., has bought site at Vandeventer and McRee avenues for a new plant.

ST. LOUIS—Braznell Co., 2227 Walnut street, manufacturer of printing inks, plans one-story plant at Market and Jameton streets.

WISCONSIN

MADISON, WIS.—Gisholt Machine Co., manufacturer of turret lathes and other machine tools, plans two-story engineering building 60 x 150 feet. Law, Law, Potter & Nystrom are architects.

MADISON, WIS.—Badger Mfg. & Supply Co. has been incorporated with 100 shares at $10 each to deal in machinery, motors and electrical appliances, by F. D. Shuttleworth, 1 West Main street, Madison.

MILWAUKEE—Frabill Mfg. Co. has been incorporated by Frank Matras, 4953 Ardmore avenue, and associates.

MILWAUKEE—Metal Coatings Inc. has been incorporated with 250 shares at $100 each to do plating, pickling, coloring and related processes, by Clarence F. Graham, 6913 Cedar street, Wauwatosa, Wis.

NORTH FOND DU LAC, WIS.—Northern Aluminum Co. has been incorporated with 100 shares no par value to operate a nonferrous foundry, by Richard Callender and associates.

CALIFORNIA

GLENDALE, CALIF.—Kinnear Motors, 605 West Colorado street, is making alterations and additions to its plant at cost of about $15,000.

LOS ANGELES—Vapor Engineering Corp. has been incorporated with $50,000 capital by F. P. Trinkhaus, Los Angeles, and associates. Louis Lombardi, 510 West Sixth street, is representative.

LOS ANGELES—Munson Machine Products Co. has been incorporated with $75,000 capital by Walter S. Munson, Inglewood, Calif., and associates. Louis Lombardi, 510 West Sixth street, Los Angeles, is representative.

LOS ANGELES—Smithson Co. has been formed by W. K. Smithson and J. M. Caldwell and has established a machine shop at 219 South Mednik street.

RIVERSIDE, CALIF.—Valley Motor Parts & Machine Shop has been formed by S. L. Holmes and F. D. Echols and has its plant at 3372 Eighth street, Riverside.

SAN DIEGO, CALIF.—Solar Aircraft Co. has building permit for addition to test building at 1212 West Juniper street, 30 x 60 feet.

DPC Authorizes Plant Expansion, Equipment

Defense Plant Corp. has authorized the following expansions and equipment purchases (figures are approximate):

Rohm & Haas Co., Philadelphia, $615,000 for equipment at a plant in Bristol, Pa., for production of war chemicals.

Leland Electric Co., Dayton, O., $80,000 for equipment at a plant in Dayton for production of electric motors.

Western Electrochemical Co., Los Angeles, $5 million to provide equipment in part of the Basic Magnesium plant at Las Vegas, Nev., for production of potassium perchlorate.

Hegeler Zinc Co., Danville, Ill., $75,000 to provide plant facilities at Danville, for production of strip zinc.

Servel Inc., Evansville, Ind., $50,000 increase in contract to provide additional equipment at a plant at Evansville.

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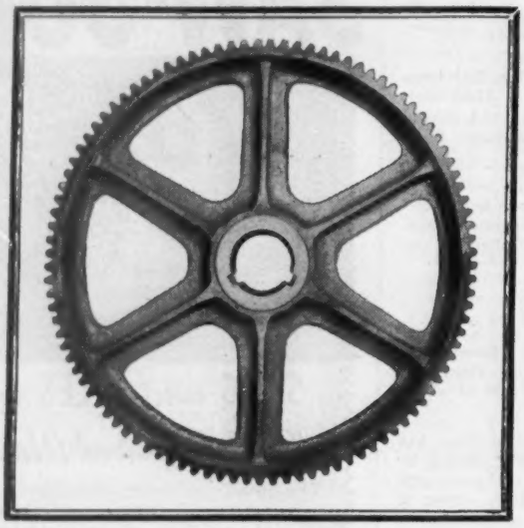

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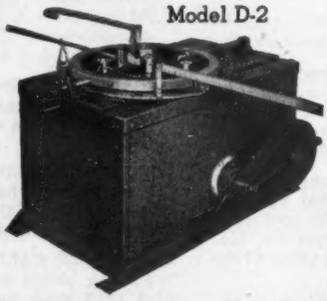
KARDONG FOUR-WAY BENDER

Model D-2



The Model D-2 Kardong Bender is a Four Direction Horizontal bender. With this bender when bending large bars it is not necessary to turn bars over to make reverse or second bends or 180 degree hook bends. The Model D-2 is equipped to bend bars around collars from 2 inch to 6 inch in diameter. Also made to bend up to 8 inch in diameter. Capacity of Model D-2 1¼ inch Square Bars. The Model D-2 is a production bender for concrete reinforcing steel for shop or fabricating plant. Ask for our catalog of our complete line of reinforcing bar benders.

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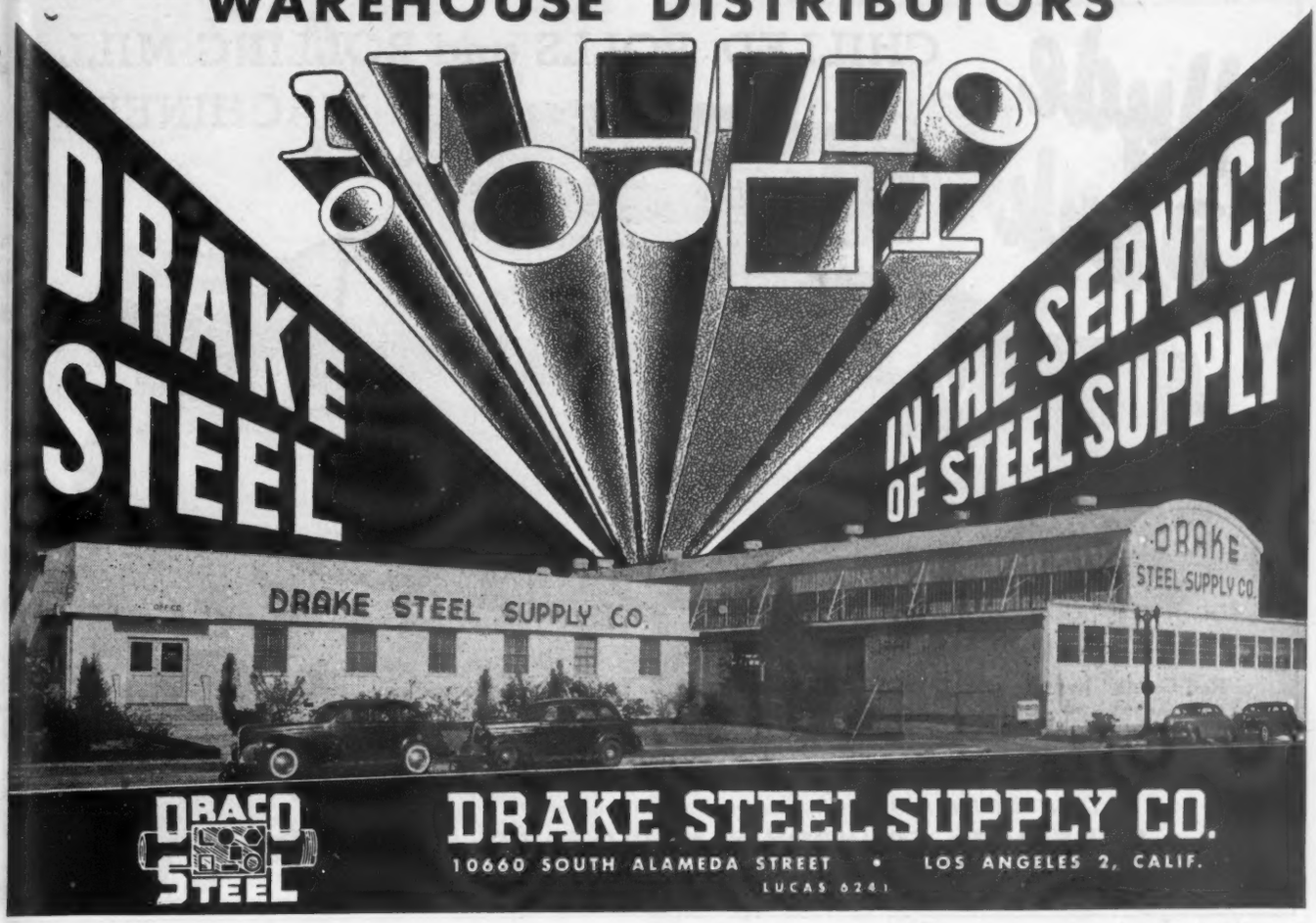

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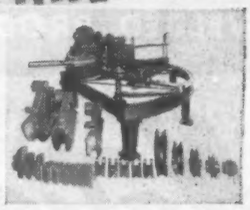

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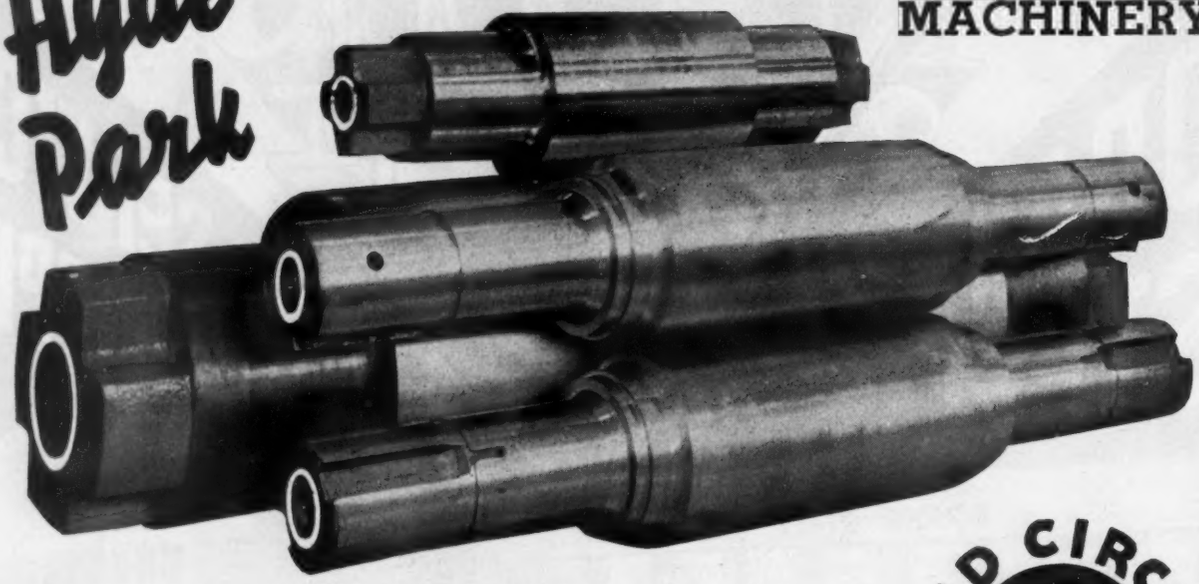

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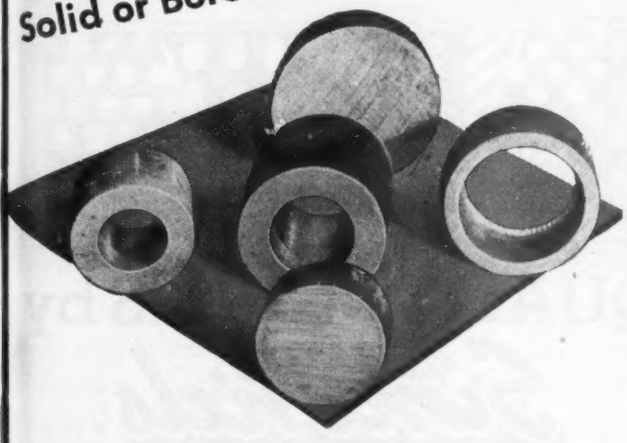

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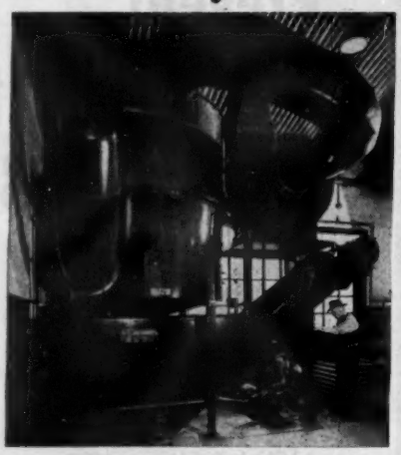

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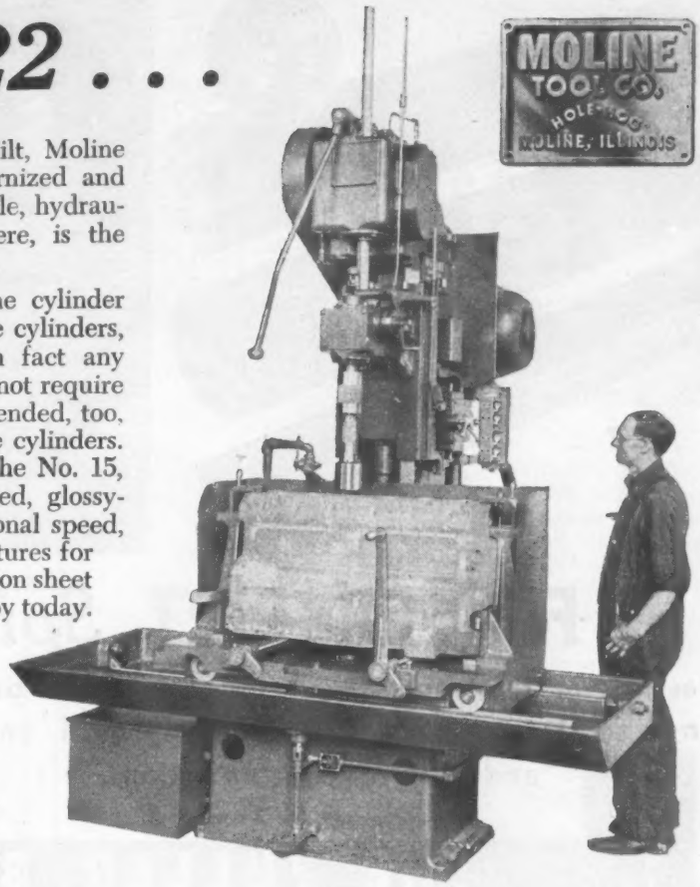

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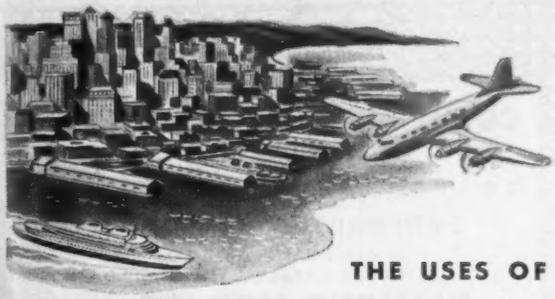

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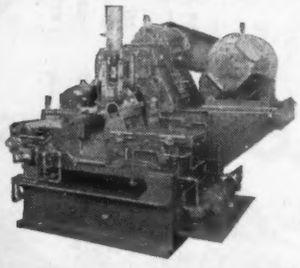

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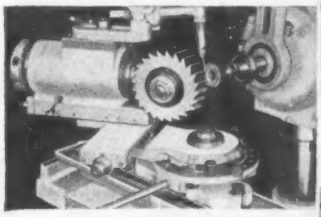
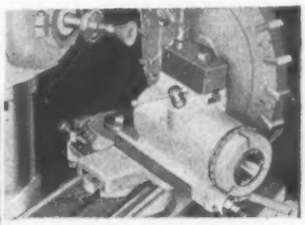
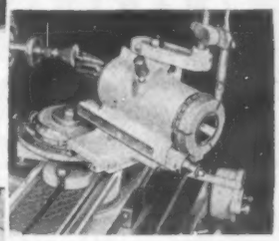
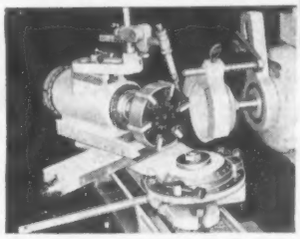




Grinding radius on a 10" Milling Cutter



Grinding radius on 4" Insert Tooth Face Mill



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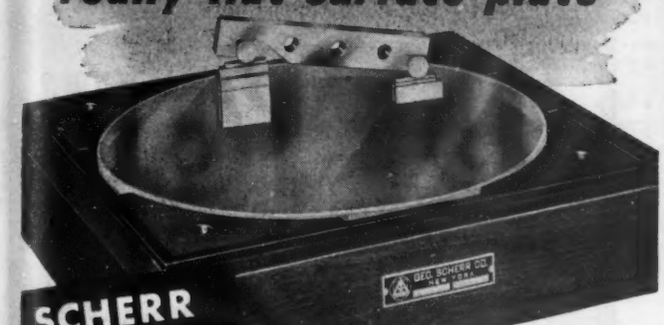

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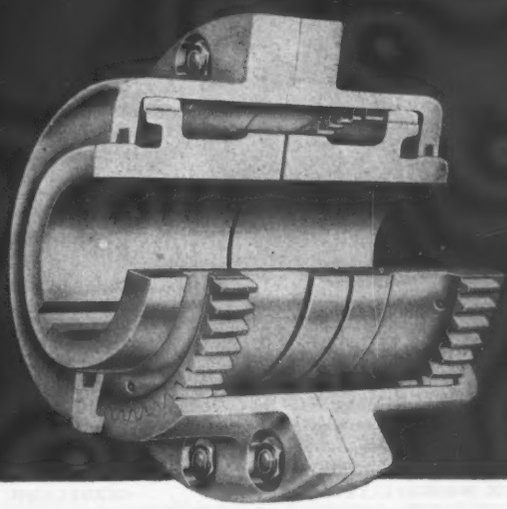

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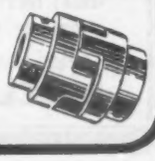

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ADVERTISING INDEX

A

Abrasive Co. ... 6
Aircraft Mechanics, Inc. ... 193
Allegheny Ludlum Steel Corp. ... 8
Allen-Bradley Co. ... 33, 34
Allis-Chalmers Mfg. Co. ... Inside Front Cover, 9
Aluminum Company of America ... 153
American Chain & Cable Co., Inc., American Chain Division ... 152
American Chain Division of American Chain & Cable Co., Inc. ... 152
American Crayon Co., The ... 197
American Foundry Equipment Co. ... 150
American Hot Dip Galvanizers Assn., Inc. ... 64
American Petrometal Corp. ... 210
American Pipe Bending Machine Co., Inc. ... 203
Ampco Metal, Inc. ... 146
Associated Engineers, Inc. ... 200
Athenia Steel Co., The ... 63
Atlas Drop Forge Co. ... 169
Atlas Lumnite Cement Co., The ... 48
Atlas Metal Stamping Co. ... 40
Atlas Tool & Designing Co. ... 40

B

Babcock & Wilcox Co., Refractories Div. ... 124
Baker & Adamson Division of General Chemical Co. ... 163
Baldwin Locomotive Works, Standard Steel Works Division ... 131
Bartlett, C. O., & Snow Co. ... 156
Basic Refractories, Inc. ... 5
Beall Tool Co. ... 203
Belmont Iron Works ... 210
Benedict-Miller, Inc. ... 210
Bethlehem Steel Co. ... 1
Bison Forge Co. ... 211
Bixby, R. W., Inc. ... 214
Blanchard Machine Co., The ... 119
Bridgewater Screw Products Co. ... 215
Brooke, E. & G., Iron Co. ... 210
Browning, Victor R., & Co., Inc. ... 212
Brush Development Co., The ... 170
Buffalo Bolt Co. ... 61
Buffalo Forge Co. ... 17
Bundy Tubing Co. ... 16
Bunting Brass & Bronze Co., The ... 184

C

Carboloy Co., Inc. ... 115
Carborundum Co., The ... 14
Ceilcote Co., The ... 212
Century Electric Co. ... 137
Chicago Perforating Co. ... 206
Chisholm-Moore Hoist Corp. ... 132
Chromium Mining & Smelting Corp., Ltd. ... 47
Cincinnati Grinders, Inc. ... 86, 87
Cincinnati Milling Machine Co., The ... 86, 87
Clark Tructractor Div. of Clark Equipment Co. ... 134
Cleveland Crane & Engineering Co., The ... 139
Cleveland Punch & Shear Works Co., The ... 12
Cleveland Twist Drill Co., The ... 171
Cleveland Worm & Gear Co. ... Inside Back Cover
Climax Molybdenum Co. ... 93
Commercial Forgings Co., The ... 205
Consolidated Machine Tool Corp. ... 37
Continental Steel Corporation ... 13
Cowles Tool Co. ... 210

D

Davis Brake Beam Co. ... 211
De Laval Steam Turbine Co. ... 66
Delta Manufacturing Co., The ... 166
Detroit Power Screwdriver Co. ... 140
Detroit Steel Corp., Reliance Steel Division ... 54
Diamond Mfg. Co. ... 210
Differential Steel Car Co. ... 210
Disston, Henry, & Sons, Inc. ... 167
Donaldson Co., Inc. ... 192
Dow Corning Corp. ... 123
Drake Steel Supply Co. ... 203
Dulien Steel Products, Inc. ... 213

E

Edison, Thomas A., Inc. ... 127
Electro Metallurgical Co. ... 53
Enterprise Galvanizing Co. ... 212
Erdle Perforating Co., The ... 204
Eureka Fire Brick Works ... 212

F

Farrel-Birmingham Co., Inc. ... 52
Federal Screw Works ... 138
Follansbee Steel Corp. ... 141
Foster, L. B., Co. ... 213
Frasse, Peter A., & Co., Inc. ... 43
Fuller Brush Co., The ... 208

G

Gates Rubber Co., The ... 30
General Chemical Co. ... 19
General Electric Co. ... 38, 177
Gerding Bros. ... 215
Gisholt Machine Co. ... 25
Gordon, Claud S., Co. ... 202
Grant Gear Works ... 196
Greenspon's, Jos., Son Pipe Corp. ... 213
Gulf Oil Corp. ... 143
Gulf Refining Co. ... 143

H

Hanna Engineering Works ... 29
Hanlon-Gregory Galvanizing Co. ... 117
Harnischfeger Corp. ... 209
Harrington & King Perforating Co., The ... 174
Haskins, R. G., Co. ... 197
Heil Engineering Co. ... 212
Hendrick Manufacturing Co. ... 202
Heppenstall Co. ... 149
Hevi-Duty Electric Co. ... 173
Hobart Bros. Co. ... 101
Holliday, W. J., & Co. ... 36
Horsburgh & Scott Co., The ... 130
Houghton, E. F., & Co. ... 60
Hubbard, M. D., Spring Co. ... 205
Hyatt Bearings Div., General Motors Corp. ... 90
Hyde Park Foundry & Machine Co. ... 204

I

Industrial Oven Engineering Co., The ... 204
Ingersoll Steel & Disc Division, Borg-Warner Corp. ... 136
Inland Steel Co. ... 74
International Nickel Co., Inc., The ... 70
Iron & Steel Products, Inc. ... 213

J

James, D. O., Manufacturing Co. ... 202
Johnson Bronze Co. ... 182
Johns-Manville ... 32
Jones & Laughlin Steel Corp. ... 135

K

Kardong Brothers, Inc. ... 202
Kennametal, Inc. ... 145
King Foundries, Inc. ... 215
Kondor Products Corp. ... 164
Korfund Co. ... 160

L

Lakeside Steel Improvement Co., The ... 161
Landis Machine Co. ... 10, 11
Layne & Bowler, Inc. ... 199
Lee, K. O., Co. ... 209
Lovejoy Flexible Coupling Co. ... 211

M

Mackintosh-Hemphill Co. ... 183
Mahon, R. C., Co., The ... 68
Matthews, Jas. H., & Co. ... 207
Meaker Co., The ... 195
Medart Co., The ... 168
Merrill Brothers ... 208
Michigan Seamless Tube Co. ... 18
Mid-States Equipment Co. ... 201
Midvale Co., The ... 22
Moline Tool Co. ... 207
Monarch Machine Tool Co., The ... 2, 3
Morgan Lumber Sales Co. ... 174
Motor Products Corporation ... 39

N

National Acme Co., The ... 62
National Annealing Box Co. ... 204
National Forge & Ordnance Co. ... 20
National Lead Co. ... 23
National Screw & Mfg. Co., The ... 129
National-Standard Co. ... 63
National Steel Corporation ... 67
New York & New Jersey Lubricant Co. ... 205
Nilson, A. H., Machine Co. ... 215
Northwest Engineering Co. ... 7

O

Oakite Products, Inc. ... 21
Ohio Galvanizing & Mfg. Co., The ... 209
Ohio Locomotive Crane Co., The ... 210
Ohio Seamless Tube Co., The ... 159
Oliver Iron & Steel Corp. ... 142
O'Neil-Irwin Mfg. Co. ... 208
Ozalid Division of General Aniline & Film Corp. ... 155

P

Parker Appliance Co., The ... 59
Paxson Machine Co. ... 178
Pickands Mather & Co. ... 57
Pittsburgh Commercial Heat Treating Co. ... 206
Pittsburgh Plate Glass Co., Brush Division ... 56
Pittsburgh Steel Foundry Corp. ... 133
Plan-O-Mill Corporation ... 42
Poole Foundry & Machine Co. ... 211
Porter, H. K., Co., Inc. ... Front Cover
Prevost Machine Products ... 198

R

Rail & Industrial Equipment Co. ... 213
Ransohoff, N., Inc. ... 194
Ready-Power Co. ... 206
Reconstruction Finance Corp. ... 157
Reliance Steel Division Detroit Steel Corp. ... 54
Remmey, Richard C., Son Co. ... 158
Republic Steel Corp. ... 41, 65
Reynolds Metals Co. ... 50, 51
Richards, G. Whitfield ... 35
R-S Products Corp. ... 162
Ryerson, Joseph T., & Son, Inc. ... 73

S

Saginaw Malleable Iron Division of General Motors ... 45
Schneible, Claude B., Co. ... 206
Scherr, George, Co., Inc. ... 211
Scovill Manufacturing Co. ... 179
Seneca Wire & Mfg. Co., The ... 210
Seymour Manufacturing Co., The ... 58
Shenango-Penn Mold Co. ... 151
Silent Hoist & Crane Co. ... 176
Simonds Gear & Mfg. Co., The ... 206
SKF Industries, Inc. ... 28
Socony-Vacuum Oil Co., Inc. ... 24
Sonken-Galamba Corp. ... 213
Standard Steel Works Division, Baldwin Locomotive Works ... 131
Standard Tube Co., The ... 31
Sticht, Herman H., Co., Inc. ... 212
Strom Steel Ball Co. ... 207
Sundstrand Machine Tool Co. ... 55
Sun Oil Co. ... 99

T

Taylor-Wilson Mfg. Co. ... 209
Thomas Machine Manufacturing Co. ... 178
Titan Metal Manufacturing Co. ... 154
Toledo Stamping & Manufacturing Co. ... 211
Torrington Co., The ... 165
Towmotor Corp. ... 148
Turner Gauge Grinding Co. ... 172

U

Udylite Corp, The ... 144
Union Carbide & Carbon Corp. ... 53
United States Steel Corp., Subsidiaries ... 15, 48
United States Steel Supply Co. ... 15

V

Vinco Corporation ... 44
Vulcan Iron Works ... 26, 27

W

Walker-Turner Co., Inc. ... 147
Washburn Wire Co. ... 49
Wean Engineering Co., Inc. ... Back Cover
Weinman Pump & Supply Co., The ... 210
Weirton Steel Co. ... 67
Wheeling Steel Corp. ... 210
Wickwire Brothers, Inc. ... 209
Williams, J. H., & Co. ... 211
Wood Shovel & Tool Co., The ... 121
Worth Steel Co. ... 175

Y

Yoder Co., The ... 46

Table of Contents, Page 69
Classified Advertisers, Pages 213, 214, 215

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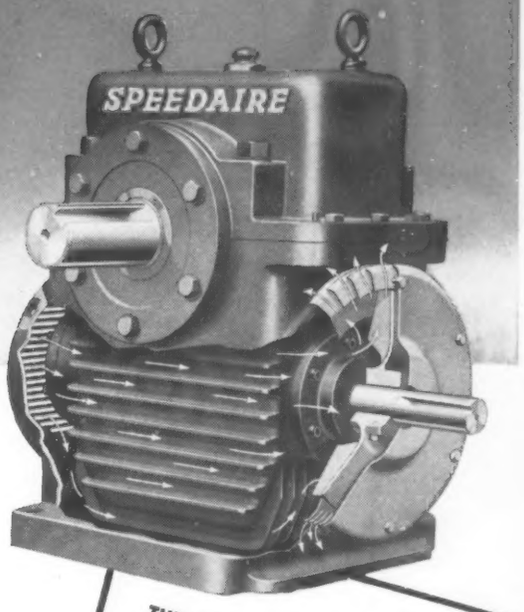

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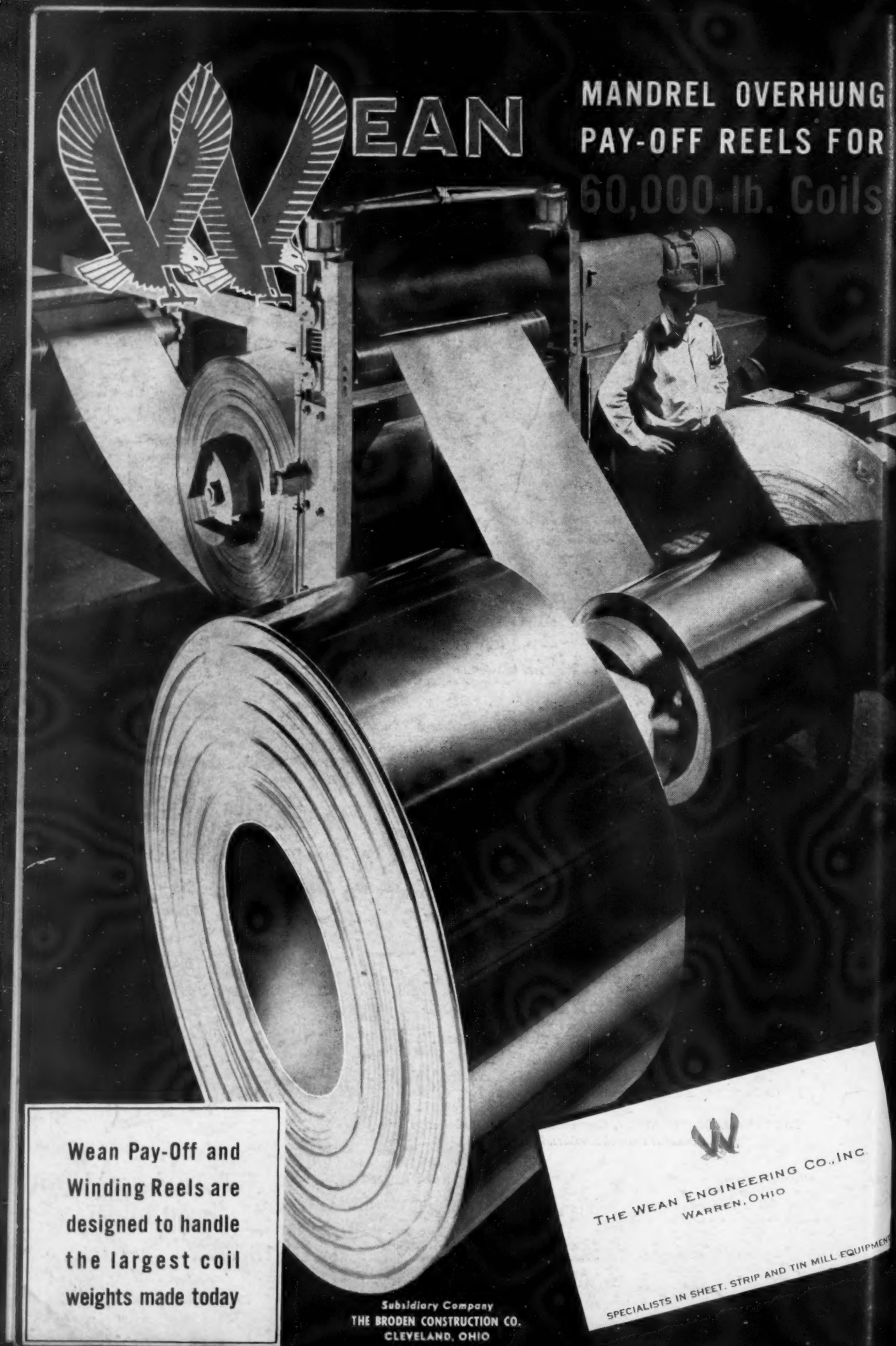

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